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4.1 LAND USE IMPACTS

This section describes the impacts of site preparation and construction to the **{**CCNPP**}** site and the surrounding area. Section 4.1.1 describes impacts to the site and vicinity. Section 4.1.2 describes impacts that could occur along transmission lines. Section 4.1.3 describes impacts to historic and cultural resources at the site.

4.1.1 THE SITE AND VICINITY

The **{**CCNPP**}** site land use is presented in Table 2.2.1-1 and shown on Figure 2.2.1-1. The land use categories are consistent with USGS land use/cover categories. Land use/cover within the 8 mi (13 km) site vicinity is presented in Table 2.2.1-2 and shown on Figure 2.2.1-2. Highways and utility right-of-ways that cross the site and vicinity are shown on Figure 2.2.1-4 and Figure 2.2.2-2.

4.1.1.1 The Site

{CCNPP Unit 3 and supporting facilities would be located on the 2,057 acre (832 hectares) CCNPP site, to the southeast of and adjacent to CCNPP Units 1 and 2. The CCNPP site use activities will not change as the result of the proposed action. The CCNPP site acreage were purchased for and used by Constellation Energy for the purpose of generating electricity. The proposed action of the construction and operation of an additional power unit does not alter the site's current use. The CCNPP site will conform to all applicable local, state, and Federal land use requirements and restrictions as they pertain to the proposed action. Figure 4.1-1 shows the current Calvert County zoning categories for the CCNPP site.

The State of Maryland and Calvert County have land use plans that attempt to limit sprawl and encourage smart growth primarily through zoning ordinances. Through regulation, the Federal, State, and County governments attempt to limit potential environmental impacts to coastal areas including the Chesapeake Bay. The CCNPP site would follow all local, state, and federal requirements that pertain to the Coastal Zone Management Program (MDE, 2004) regulations and those regulations pertaining to the Chesapeake Bay Critical Area (CALCO, 2006) (CAC, 2006). During construction, site activities are required to be authorized by the agencies and programs listed in Table 1.3-1. There are no recognized Native American Tribal Land use plan that would have jurisdiction over the CCNPP site or within the vicinity of the CCNPP site that could impact the CCNPP site.

Table 4.1-1 provides an estimate of the land areas that would be disturbed during construction of CCNPP Unit 3 and supporting facilities, including temporary features such as laydown areas, stormwater retention ponds, and borrow areas. Approximately 420 acres (170 hectares) of the CCNPP site would be disturbed by site preparation and construction. Approximately 281 acres (114 hectares) would be permanently dedicated to CCNPP Unit 3 and its supporting facilities, and lost to other uses until after decommissioning. Approximately 140 acres (56 hectares) would be temporarily impacted. Acreage not containing permanent structures would be reclaimed to the maximum extent possible.

From Figure 4.1-1, an estimate was made regarding the amount of land currently zoned as Forest and Farm District within the CCNPP site boundary that would be affected by the proposed construction activities. Approximately 147 acres (59 hectares) of land currently zoned Forest and Farm District will be permanently (134 acres (54 hectares)) or temporarily (13 acres (5.2 hectares)) impacted by the construction activities.

As discussed in Section 4.3.1.1, an estimated 191 acres (77 hectares) of mixed deciduous forest would be lost during construction activities, approximately 28 acres (11 hectares) of which would be temporary. Additional information is provided on Table 4.3.1-1.

Section 2.2.1 describes the land areas that are devoted to major uses within the CCNPP site boundary and the CCNPP site vicinity. These areas are depicted on Figures 2.2-1 and 2.2-2, respectively. In addition, Section 2.2.1 describes the highways and utility right-of-way that cross the CCNPP site and vicinity. The footprint for the proposed unit and supporting facilities will be partially located on land and facilities associated with Camp Conoy, a recreational facility formerly used by CCNPP employees. This area is not open to the public; thus, there would be no impact to public recreation areas as the result of the proposed action. Constellation Generation Group and UniStar Nuclear Operating Services are not aware of any Federal action in the area that would have cumulatively significant land use impacts.

Heavy equipment and reactor components would be barged up the Chesapeake Bay to the existing barge slip. The slip area would be dredged and the existing heavy haul road from the barge slip would be modified and extended to the new construction site and lay down areas. A new access road, approximately 2.5 mi (4 km) long, would be constructed from Maryland State Road 2/4 to the construction site providing access to the construction areas without impeding traffic to the existing units. A site perimeter road system and access road around the cooling tower area to the power block would be built. Another road would be constructed to the proposed water intake structure.

The new intake, discharge, and barge facilities would be located in the 100 year coastal floodplain. With those exceptions, construction activities would be outside the 500 year floodplain in areas designated as areas of minimal flooding (FEMA, 1977).

The proposed location of CCNPP Unit 3 and supporting facilities is not farmland, and does not possess any prime farmland soils. The CCNPP site itself is predominantly forested with areas categorized as “Urban” or “Built-up” in the vicinity of the areas of current CCNPP operational facilities. In addition, the only known mineral deposits currently being extracted in Calvert Country are sand and gravel as described in Section 2.2.1.2. There are no known economic mineral deposits on the CCNPP site.

The proposed construction activities would result in the permanent loss, through filling, of approximately 18.6 acres (7.5 hectares) of non-tidal wetland habitat and approximately 48 acres (19 hectares) of non-tidal wetland buffer. Section 4.3.1.3 provides a detailed discussion of construction impacts to wetlands.

Construction would also impact 30.3 acres (12.3 hectares) within the Chesapeake Bay Critical Area including approximately 0.4 acres (0.16 hectares) within the Chesapeake Bay Critical Area Buffer zone that extends 100 ft (30.5 m) landward of mean high tide. This occurs in the vicinity of the proposed intake and discharge pipelines, the heavy haul road, stormwater retention basins, and security fencing. Section 4.3.1 provides a detailed discussion of construction impacts within the Chesapeake Bay Critical Area.

In the event the construction of CCNPP Unit 3 is not completed, a Site Redress Plan describing the return of the site to preconstruction conditions is provided in Part 6 of the COL application.

It is concluded that the land use impacts to the CCNPP site and vicinity of the CCNPP site from construction of the new unit would be MODERATE, primarily due to the loss of wetlands and wetland buffers, and would require mitigation. The mitigation measures associated with the wetlands and wetland buffers are described in Section 4.3.1.4.**}**

4.1.1.2 The Vicinity

{Land in the vicinity of the CCNPP site is rural with development generally occurring in town centers per current Calvert County zoning and planning requirements. Land use within 8 miles (13 km) of the site is predominantly forest as described in Figure 2.2.1-2.

The construction activities that would degrade the visual aesthetics of the land would be limited to those activities potentially seen from the new construction access road. Because of the forested nature of the area surrounding the proposed site, it is unlikely that construction activities for the proposed facilities could be seen directly from the adjacent highway, with the exception of the activities to build or upgrade the CCNPP site access road. Once the proposed facility construction extends above the tree line, some construction could be seen from roadways or other areas in the vicinity of the site depending on the area's topography and the immediate land cover. However, because a portion of the CCNPP site is currently zoned as industrial and already contains CCNPP Units 1 and 2, visual impacts from the proposed project would be similar to existing site conditions.

Section 4.4.2.4 provides the details on potential population impacts due to construction activities. The majority of the temporary construction workforce would probably live outside of Calvert County and St. Mary's County. These workers would commute or find temporary housing in Calvert County or St. Mary's County. No other land use changes in the vicinity would likely occur as a result of construction workforce related population changes.

Thus, it is concluded that impacts to land use in the vicinity of CCNPP Unit 3 would be SMALL, and not require mitigation.**}**

4.1.2 TRANSMISSION CORRIDORS AND OFFSITE AREAS

{The additional electricity generated from CCNPP Unit 3 will not require the addition of new offsite right-of-way. As discussed in Section 2.2.2.2, the proposed CCNPP Unit 3 construction activities on the CCNPP site would include the following transmission system changes:

- One new 500 kV substation to transmit power from CCNPP Unit 3
- Two new 500 kV, 3,500 MVA circuits connecting the new CCNPP Unit 3 substation to the existing CCNPP Units 1 and 2 substation

Numerous breaker upgrades and associated modifications would also be required at Waugh Chapel substation, Chalk Point Generating Station, and other existing substations.

The North and South Circuits of the CCNPP power transmission system are located in corridors totaling approximately 65 miles (105 km) of 350 to 400 ft (100 to 125 m) wide corridors owned by Baltimore Gas and Electric. The lines cross mostly secondary-growth hardwood and pine forests, pasture, and farmland. The existing CCNPP Units 1 and 2 are also connected to the Southern Maryland Electric Cooperative's Bertha substation via a 69 kV underground transmission line.

The transmission line work being considered to support this project would require new towers and transmission lines to connect the CCNPP Unit 3 switchyard to the existing switchyard for CCNPP Units 1 and 2. Line routing would be conducted to avoid or minimize impact on the existing Independent Spent Fuel Storage Installation (ISFSI), wetlands, and threatened and endangered species identified in the local area. No new offsite corridors or widening of existing corridors are required. The proposed onsite connector corridor would be located on land already in use to generate electric power. Some of the proposed facility locations associated with the project are located on land currently zoned and used as light industrial. The remainder is zoned as Farm and Forest District. CCNPP Unit 3 will be exempt from the Calvert County

Zoning Ordinance once the CPCN for CCNPP Unit 3 is issued. However, all federal, state, and local regulations and requirements including those that deal with construction impacts, and those regulations pertaining to the Coastal Zone Management Program, the Chesapeake Bay Critical Area, and the Maryland Public Service Commission would be complied with.

There are no Federal actions that would have cumulatively significant land use impacts within the vicinity and region of the CCNPP site activity and offsite areas as described in Section 2.8.

Because there are no new offsite transmission corridors, it is concluded that there will be no additional impacts to the offsite transmission corridor lands associated with the proposed construction of CCNPP Unit 3. The proposed onsite transmission line connector corridor would be located on land already in use to generate electric power. No new access roads of modifications to existing roads are currently anticipated.**}**

4.1.3 HISTORIC PROPERTIES

{Tables 2.5.3-4 and 2.5.3-5 list resources within the proposed project's Area of Potential Effect (APE) that are potentially eligible or eligible for listing on the National Register of Historic Places (NRHP). These tables reflect the comments received from the Maryland State Historic Preservation Office (SHPO) (MHT, 2007). As described in Section 2.5.3, the cultural resource survey of the CCNPP site identified fourteen archaeological sites, four of which are considered potentially eligible for inclusion on the NRHP. The survey also identified five architectural resources, four of which are considered eligible for the NRHP.

The preliminary assessment of adverse effects to the eight NRHP resources from project construction activities is as follows. It is likely that the four identified archaeological sites would be heavily damaged by construction activities and use, thereby resulting in an adverse effect to those resources. Of the four architectural resources, two would be adversely affected. These two architectural resources are the Baltimore and Drum Point Railroad roadbed and Camp Conoy. These architectural resources are located within the 600 acre (243 hectares) APE and would be heavily damaged by construction activities and use, resulting in an adverse effect to these resources. The Preston Cliffs property is located approximately 1,500 ft (457 m) away from the outer boundary of the APE and would not be damaged by construction activities and use. There would also be no adverse effect to the setting of this property, as CCNPP Units 1 and 2 are adjacent to this property and would be located between the property and CCNPP Unit 3 and its cooling tower facility. The Parran's Park property is within the 600 acre (243 hectares) APE. However, it is located in a portion of the project site that would only include development of a construction access road and would not be damaged by construction activities and use. There would also be no effect to the setting of this property, as the access road is already in existence and facilities associated with CCNPP Units 1 and 2 are adjacent to this property.

Consultation on the Phase I cultural resources survey with Native American tribes is pending. This consultation could result in changes to the recommended National Register of Historical Places eligibility of the 19 identified resources. Phase II archaeological investigations and subsequent SHPO consultation would be conducted on potentially eligible archaeological resources that are located within the proposed project area and cannot be avoided, to determine their eligibility. Upon completion of Phase II investigations and SHPO consultations, assessments of effect on the National Register of Historical Places eligible resources on the project site would be determined and consultation conducted with the SHPO to identify measures to avoid, minimize, or mitigate any adverse effects, per Section 106 of the National Historic Preservation Act (USC, 2007).

Extensive areas in the Chesapeake Bay have been previously dredged for the existing discharge conduit and channel, cooling water intake channel, the barge dock and channel, and the shore protection revetment. Construction of the new intake channel and discharge conduit would occur within areas previously dredged or disturbed by construction. Thus, there would be no impacts to historic properties from construction of these facilities.

With construction activities, there is always the possibility for inadvertent discovery of previously unknown cultural resources or human remains. Prior to initiation of land disturbing activities, procedures will be developed which include actions to protect cultural, historic, or paleontological resources or human remains in the event of discovery. These procedures will comply with applicable Federal and State laws. These laws include the National Historic Preservation Act (USC, 2007), and Code of Maryland, Criminal Law, Title 10, Subtitle 4, Sections 10-401 through 10-404 (MD, 2004a) and the Code of Maryland, Title 4, Subtitle 2, Section 4-215 (MD, 2004b).

It is concluded that there will be adverse inputs impacts to historic or cultural resources from construction. Upon completion of the Phase II investigations and SHPO consultation, assessments of effect on the National Register-eligible resources located in the APEs would be determined and consultation conducted with the SHPO to identify measures for avoidance, minimization, or mitigation of any adverse effects, per Section 106 of the National Historic Preservation Act. Any identified measures would be delineated in a Memorandum of Agreement between NRC, the SHPO, Constellation Generation Group, UniStar Nuclear Operating Services, and Advisory Council on Historic Preservation.

The magnitude of the impacts and requirements for mitigation are determined to be <u>moderate</u>.

4.1.4 REFERENCES

{CAC, 2006. Critical Area Commission for the Chesapeake and Atlantic Coastal Bays, Critical Area Commission, Website: www.dnr.state.md.us/criticalarea/, Date accessed: May 7, 2006.

CALCO, 2006. Calvert County Zoning Ordinances, Calvert County, Website: Date accessed: May 16, 2006.

FEMA, 1997. Flood Hazard Boundary Map, Calvert County, Maryland, Federal Emergency Management Agency, July 15, 1997, Website: www.fema.gov/hazard/flood/index.shtm, Date accessed: December 21, 2006.

MD, 2004a. Code of Maryland, Criminal Law, Title 10, Subtitle 4, Sections 10-401 through 10-404, January 2004.

MD, 2004b. Code of Maryland, Criminal Law, Title 4, Subtitle 2, Section 4-215, January 2004.

MDE, 2004. A Guide to Maryland's Coastal Zone Management Program Federal Consistency Process, Maryland Department of the Environment, February 2004.

MHT, 2007. Letter from J. Rodney Little, Director/State Historic Preservation Officer, Maryland Historic Trust to R. M. Krich, June 7, 2007.

USC, 2007. Title 16, United States Code, Part 470, National Historic Preservation Act of 1966, as amended, 2007.**}**

Table 4.1-1 {Construction Areas Acreage and Operations Acreage, Land Use and Zoning}
(Page 1 of 1)

Construction Area	Construction Acreage (hectares)	Current Land Use	Current Zoning
Unit 3 Power Block	45.8 (18.5)	Forest and Urban or Built Up	I-1 and FFD
Unit 3 Switchyard	59.3 (24)	Forest	I-1 and FFD
Unit 3 Cooling Tower Area	18.1 (7.3)	Forest	FFD
Permanent Laydown Area	59 (23.9)	Urban or Built Up	I-1
Parking Area	17.7 (7.2)	Urban or Built Up	I-1
Connector Transmission Lines (Onsite)	11.7 (4.7)	Forest and Urban or Built Up	I-1
Desalinization Plant	0.46 (0.18)	Forest	FFD
Waste Water Treatment Facility	0.29 (0.12)	Forest	FFD
Heavy Haul Road	15.7 (6.4)	Urban or Built Up	I-1
Construction Access Road	42.8 (17.3)	Urban or Built Up	I-1 and FFD
Borrow Area	4.8 (1.9)	Urban or Built Up	I-1
Stormwater Retention Basins Adjacent to the Permanent Construction Features	5.3 (2.2)	Forest and Urban or Built Up	FFD and I-1
Total Acreage of Disturbed Area for Permanent Construction Features	**280.95 (113.7)**	--	--
Temporary Laydown Areas	106.7 (43.2)	Urban or Built Up and Forest	I-1 and FFD
Concrete Batch Plant, Material Storage	26.2 (10.6)	Urban or Built Up	I-1
Retention Basins Adjoining Temporary Features	6.2 (2.5)	Urban or Built Up and Forest	I-1 and FFD
Total Acreage of Disturbed Area for Temporary Construction Features	**139.1 (56.3)**	--	--

Notes:

I-1 = Light industrial
FFD = Farm and Forest District

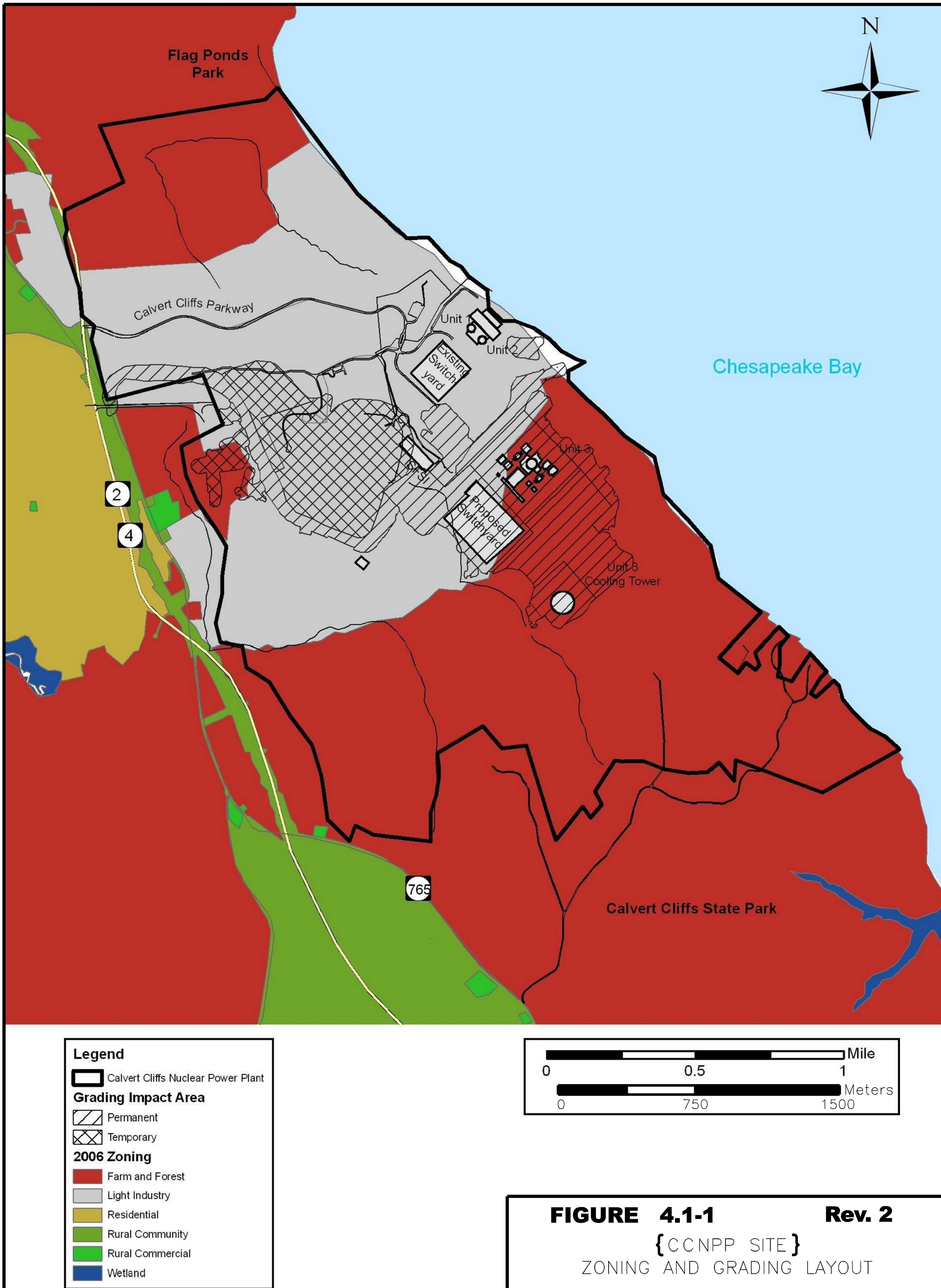

FIGURE 4.1-1 **Rev. 2**

{CCNPP SITE}

ZONING AND GRADING LAYOUT

CCNPP UNIT 3 ER

4.2 WATER-RELATED IMPACTS

The following sections describe the hydrologic alterations and water use impacts that result from the construction of the **{**Calvert Cliffs Nuclear Power Plant (CCNPP) Unit 3**}**. Section 4.2.1 describes the hydrologic alterations resulting from construction activities including the physical effects of these alterations on other users, the best management practices to minimize any adverse impacts and how the project will comply with the applicable Federal, State and local standards and regulations. Section 4.2.2 describes the potential changes in water quality and an evaluation of the impacts resulting from construction activities on water quality, availability and use.

4.2.1 HYDROLOGIC ALTERATIONS

This section discusses the proposed construction activities including site preparation, the resulting hydrologic alterations and physical effects of these activities on other water users, best management practices to minimize adverse impacts, and compliance with applicable Federal, State and local environmental regulations.

4.2.1.1 Description of Surface Water Bodies and Groundwater Aquifiers

{The CCNPP site covers an area of approximately 2,057 acres (832 hectares) and is located on the western shore of Chesapeake Bay in Calvert County, Maryland near Maryland State Highway 2/4 as shown in Figure 2.1-2. Additional details on the CCNPP site location and surrounding area are provided in Section 2.1.

The topography at the CCNPP site is gently rolling with steeper slopes along stream courses. Local relief ranges from sea level up to an elevation of 130 ft (40 m) with an average relief of approximately 100 ft (30 m). The CCNPP site is well drained by short, intermittent, and perennial streams. Six existing surface water impoundments are present on the site. A drainage divide (ridge) runs approximately from southeast to northwest across the CCNPP site as shown in Figure 2.3.1-4. Approximately 20% of the existing CCNPP site surface runoff is directed to drainages discharging into Chesapeake Bay. The remaining 80% of the runoff flows into tributaries of Johns Creek.

Surface Water Bodies

The surface water bodies (Fig 2.3.1-4) within the hydrologic system at CCNPP that may be affected by the construction and operation of Unit 3 are:

- Two unnamed streams designated (Branch 1 and 2) on the eastern side of the drainage divide, Branch 1 being downstream of the Camp Conoy Fishing Pond;
- Johns Creek, Branch 3 and Branch 4, and the unnamed headwater tributaries;
- Goldstein Branch;
- Laveel Branch;
- Camp Conoy Fishing Pond and two downstream impoundments;
- Lake Davies and two unnamed impoundments within the Lake Davies dredge spoils disposal area; and
- Chesapeake Bay and Patuxent River.

The streams listed above are perennial and are typically fed by springs and seeps.

The Camp Conoy fishing pond is a man-made impoundment with an earthen dam on the northeast side. Water depth increases slowly away from the shoreline, with a depth of less than 1 ft (0.3 m) over most of the lake and may exceed 3 ft (1 m) near the center. An outlet pipe conveys water from the fishing pond to a single stream channel which continues northeast toward Chesapeake Bay. Two smaller impoundments were created along this channel, and water depth in these two impoundments does not appear to exceed 1 to 2 ft (0.3 to 0.6 m) in most locations. These two impoundments are within the Chesapeake Bay Critical Area boundary.

A series of three man-made impoundments are present south of the existing dredge spoils disposal area near the center of the CCNPP site. These sequentially connected basins convey stormwater runoff from the dredge spoils disposal area to Johns Creek. Water levels in Johns Creek appear to be heavily influenced by surface runoff from the dredge spoils disposal area. The upper, pond closest to the spoils pile (Lake Davies) appears to extend to a depth below the water table and has open water of unmeasured depth at its center. The downstream impoundments do not typically contain surface water but persist as wetlands.

USGS gauging stations exist for downstream areas of the Patuxent River and these records are presented in Section 2.3.1. Additional details on the surface water drainage and hydrology are also presented in Section 2.3.1 and the Final Wetland Delineation Report (TTNUS, 2007).

Groundwater Aquifers

The local aquifer systems that could be impacted by project construction activities at the CCNPP site are, from shallow to deep, the: Surficial aquifer, Piney Point - Nanjemoy aquifer, and the Aquia aquifer. The hydrostratigraphic column for the CCNPP site and surrounding area, identifying geologic units, confining units, and aquifers is shown in Figure 2.3.1-31. A schematic cross-section of the southern Maryland hydrostratigraphic units is shown in Figure 2.3.1-32. The physical characteristics of the groundwater aquifers are provided in Sections 2.3.1 and 2.3.2.

The Surficial aquifer is primarily tapped by irrigation wells, and some old farm and domestic wells. It is not widely used as a potable water supply because of its vulnerability to contamination and unreliability during droughts. The Piney Point - Nanjemoy aquifer and underlying Aquia aquifer are the chief sources of groundwater in Calvert County and St. Mary's County. The Piney Point - Nanjemoy aquifer is primarily used for domestic water supply. The Aquia aquifer is the primary source of groundwater for major groundwater appropriation in southern Maryland.**}**

4.2.1.2 Construction Activities

The following construction activities will take place that may alter site hydrology:

Clearing, Grubbing, and Grading

{Spoils, backfill borrow, and topsoil storage areas will be established on parts of the CCNPP property. Clearing and grubbing of the site begins with harvesting trees, vegetation removal, and disposal of tree stumps. Topsoil will be moved to a storage area (for later use) in preparation for excavation. The general plant area including the switchyard and cooling tower area will be brought to plant grade in preparation for foundation excavation and installation. As described in Section 4.1, approximately 420 acres (170 hectares) of land will be cleared for road, facility construction, laydown and parking uses.

Road Construction

A new and upgraded intersection at Nursery Road on Maryland State Highway (MD) 2/4, south of the existing Calvert Cliffs Parkway to CCNPP Units 1 and 2, will be built and utilized as a construction access route into the CCNPP Unit 3 construction area. Approximately 2 mi (3 km) of road will be upgraded and built to accommodate the traffic into the construction area. The existing barge slip heavy haul road will also be upgraded and extended to the Unit 3 site area and construction laydown areas. The maximum slope for the existing and extended haul road is 4% grade. A CCNPP Unit 3 site perimeter road system will be installed including an access road from the cooling tower area to the power block area.

Temporary Utilities

Temporary utilities include above-ground and underground infrastructure for power, communications, potable water, wastewater and waste treatment facilities, fire protection, and for construction gas and air systems.

Temporary Construction Facilities

Temporary construction facilities include offices, warehouses, sanitary toilets, a changing area, a training area, and personnel access facilities. The site of the concrete batch plant includes the cement storage silos, the batch plant and areas for aggregate unloading and storage.

Parking, Laydown, Fabrication, and Shop Preparation Areas

The parking, laydown, fabrication and shop areas include preparation of the parking and laydown areas by grading and stabilizing the surface with gravel. The shop and fabrication areas include the concrete slabs for formwork, laydown, module assembly, equipment parking and maintenance, and fuel and lubricant storage. Concrete pads for cranes and crane assembly will be installed.

Underground Installations

Concurrent with the power block earthworks, the initial non-safety-related underground fire protection, water supply, sanitary and hydrogen gas piping, and electrical power and lighting duct banks will be installed and backfilled. These installations will continue as construction progresses.

Unloading Facilities Installation

The existing barge slip will be upgraded. New sheet pile will be installed and the existing crane foundations removed from the water. The slip will be widened by dredging to receive larger barge shipments that have roll-on, roll-off capability. Concurrently, crane foundations will be placed to erect a heavy lift crane.

Intake/Pumphouse Cofferdams

A sheet pile cofferdam and dewatering system will be installed on the south side of the CCNPP Units 1 and 2 intake structure to facilitate the construction of the CCNPP Unit 3 makeup water intake structures and pump houses. Pilings may also be driven to facilitate construction of new discharge system piping.

Excavation and dredging of the intake structures, erection of pump houses, and installation of mechanical, piping, and electrical systems follow the piling operations and continue through site preparation into plant construction. Excavated and dredged material will be transported to an onsite spoils area located outside the boundaries of designated wetlands.

Power Block Earthwork (Excavation)

The deepest excavations in the power block area are for the CCNPP Unit 3 reactor and auxiliary building foundations that extend to approximately 40 ft (12 m) below plant grade. The next deepest excavations are for the turbine building foundation area which will be excavated approximately 21 ft (6.4 m) below plant grade with the circulating water piping excavation areas extending down to 33 ft (10 m) below plant grade.

The excavations will take place concurrent with the installation of any required dewatering systems, slope protection and retaining wall systems. At a minimum, drainage sumps will be installed at the bottom of the excavations from which surface drainage and groundwater infiltration will be pumped to a stormwater discharge point. Monitoring of construction effluents and stormwater runoff would be performed as required in the stormwater pollution prevention plan, the National Pollutant Discharge Elimination System (NPDES) permit, and other applicable permits obtained for construction. Excavated material will be transferred to the spoils and backfill borrow storage areas. Acceptable material from the excavations will be stored and reused as structural backfill.

Power Block Earthwork (Backfill)

The installation of suitable backfill to support structures or systems occurs as part of the site preparation activities. Backfill material will come from the concrete batch plant, onsite borrow pit and storage areas, or offsite sources. Excavated areas will be backfilled to reach the initial level of the building foundation grade. Backfill will continue to be placed around the foundation as the building rises from the excavation until final plant grade is reached.

Nuclear Island Base Mat Foundations

The deepest foundations in the power block are installed early in the construction sequence. Detailed steps include: installation of the grounding grid, mud-mat concrete work surface, reinforcing steel and civil, electrical, mechanical/piping embedded items, forming, and concrete placement and curing.

Transmission Corridors

A new transmission substation/switchyard will be installed adjacent to the power block area for CCNPP Unit 3. A new onsite transmission corridor will be installed from the CCNPP Unit 3 switchyard to the existing CCNPP Units 1 and 2 switchyard. Tower foundations will be installed as well as an access road running along the corridor.

Offsite Areas

No offsite areas will be impacted by the construction activities for CCNPP Unit 3. The existing offsite transmission corridor and towers will be utilized for the high voltage lines for CCNPP Unit 3.**}**

4.2.1.3 Water Sources and Amounts Needed for Construction

{Construction of CCNPP Unit 3 will require an estimated 250 gpm (946 lpm) or 360,000 gpd (1,363,000 lpd) of water during the 68 month construction phase. The current CCNPP Units 1 and 2 groundwater usage varies markedly but averaged 387,000 gpd (1,465,000 lpd) from July 2001 through June 2006 as shown in Table 2.3.2-7. The current groundwater appropriations allow for a daily average of 450,000 gpd (1,700,000 lpd) with a limit of 865,000 gpd (3,270,000 lpd) daily average for the month of maximum use as shown in Table 2.3.2-6.

Initially, water for construction will be supplied from the existing CCNPP Units 1 and 2 groundwater production wells and from offsite sources as required. These water sources will eventually be replaced when the onsite desalinization plant is completed and is able to supply the necessary water from the Chesapeake Bay for the remaining construction activities. It is currently estimated that a peak water demand of up to approximately 1,200 gpm (4,500 lpm) will be required for CCNPP Unit 3 construction activities (demands include those for construction personnel, concrete manufacturing, dust control, hydro testing and flushing, and filling tanks and piping). Average construction demand would be less and is estimated at 250 gpm (950 lpm). The potential sources of water for construction include onsite groundwater from CCNP Units 1 and 2, Chesapeake Bay water (to supply the desalinization plant in construction years five and six), and offsite water trucked to the construction site. Table 4.2-1 shows the estimated amounts of fresh water needed by construction year.

The proposed desalinization plant will treat Chesapeake Bay brackish water to produce up to 1,750,000 gpd (6.62E+6 lpd) of desalinated water. The plant will use the seawater reverse osmosis desalinization process to treat Chesapeake Bay water to provide water to the CCNPP Unit 3 process users. The plant will have three portions consisting of a centralized pump center, an energy recovery center, and a reverse osmosis center. The plant will contain a pretreatment filtration system and chemical conditioning equipment to prevent fouling and mitigate corrosion in pipes and equipment. The desalinization plant is expected to reduce the salinity of the water to a level of approximately 1.67E-3 lbs/gal (200 to 300 mg/l), with the general characteristics of softened well water.**}**

4.2.1.4 Surface Water Bodies Receiving Construction Effluents that Could Affect Water Quality

{The surface water bodies as shown in Figure 2.3.1-4 within the hydrologic system at the CCNPP site that could receive effluents during CCNPP Unit 3 construction include:

- Two unnamed streams (Branch 1 and Branch 2) on the eastern side of the drainage divide, Branch 1 being downstream of the Camp Conoy Fishing Pond;
- Camp Conoy Fishing Pond and two downstream impoundments;
- Johns Creek, Branch 3 and Branch 4, and the unnamed headwater tributaries;
- Goldstein and Laveel Branches of Johns Creek;
- Lake Davies and two unnamed impoundments within the Lake Davies dredge spoils disposal area; and
- Chesapeake Bay and Patuxent River.

Several impoundments are planned to catch stormwater and sediment runoff from the various construction areas. Modeling of the runoff from the probable maximum flood (PMF) during plant operation bounds the possible runoff amounts, characteristics, and impacts that might occur during construction due to unpaved surfaces allowing for greater stormwater infiltration into the ground. The impoundments will be sized so as to prevent fast flowing, sediment laden stormwater from reaching the creeks or Chesapeake Bay prior to allowing the sediments to settle out. The flow velocities will be minimized to prevent erosion of creek and stream banks. The allowable flow rates and physical characteristics of stormwater runoff will be specified in the State discharge permits.

Maximum runoff for the entire western basin during the PMF is estimated at 21,790 cfs. The maximum high water level elevation in Johns Creek is 65 ft (19.8 m) NGVD 29, which is below the approximate 84.6 ft (25.8 m) NGVD 29 elevation of the final site grade in the power block, switchyard, and cooling tower area.**}**

4.2.1.5 Construction Impacts

{Construction of CCNPP Unit 3 with its associated cooling tower will impact several of the current drainages and impoundments at the CCNPP site. Runoff from the finished grade of the CCNPP Unit 3 power block, switchyard, cooling tower, parking areas and permanent laydown areas will be directed by sloping towards a series of bio-retention ditches around most of the periphery of these permanent features. Any excess runoff from the bio-retention ditches will in turn flow into stormwater impoundments. The bio-retention ditches will be constructed of base materials that promote infiltration of runoff from low intensity rainfall events. However, for large storms the infiltration capacity of the base materials will be exceeded and overflow pipes will direct the excess runoff to the stormwater impoundments. The final site grading plan is shown in Figure 4.2-1.

The four planned stormwater impoundments will be unlined basins with a simple earth-fill closure on the downstream end and will include a piping system that will direct any discharge to the adjacent watercourses. One impoundment is northeast of the power block and will discharge into the Branch 2 channel that flows into Chesapeake Bay. The Camp Conoy Fishing Pond will be filled in by the construction of the CCNPP Unit 3 power block and adjacent permanent laydown area. An impoundment east of this laydown area will in turn discharge into the Branch 1 channel, the two impoundments downstream of the former fishing pond, and ultimately, Chesapeake Bay. Branch 3 will be filled in by the construction, and excess runoff from the switchyard and adjacent parking areas to the north will flow into an impoundment in the Branch 3 channel and in turn discharge to Johns Creek. Runoff from the impoundment adjacent to the cooling tower will also discharge into Johns Creek.

Grading of the dredge spoils pile for a temporary laydown area, concrete batch plant, access road, and construction parking areas could increase runoff into the existing impoundments downstream of the dredge spoils pile and into temporary impoundments along the southern edge of the new access road as shown in Figure 4.2-1.

Construction impacts to the existing surface water bodies are summarized as follows:

- Increasing runoff from the approximately 333 acres (135 hectares) of impervious and relatively impervious surfaces for the CCNPP Unit 3 power block pad, cooling tower pad, switchyard, laydown, and parking areas;
- Infilling and eliminating the Camp Conoy Fishing Pond under the southeast portion of the laydown area south of the CCNPP Unit 3 power block foundation;
- Infilling and eliminating the upper reaches of Branch 2 and Branch 3, and an unnamed tributary to Johns Creek;
- Isolating portions of the upper reach of Branch 1 by construction of the laydown areas south of the CCNPP Unit 3 power block foundation;
- Disruption of the drainage in the Lake Davies dredge spoils disposal area with possible impacts on the two downstream impoundments;
- Wetlands removal and disruptions; and
- Possibly increasing the sediment loads into the proposed impoundments and downstream reaches.

The overall site drainage basin areas are not directly affected by the proposed site grading plan. The 80% / 20% drainage proportion to the west and east respectively, will stay the same during and after construction. Approximately 15 to 20 acres (6 to 8 hectares) will be added to the east drainage basin and removed from the west drainage basin.**}**

These impacts to surface water bodies are MODERATE, primarily due to the loss of wetlands and wetland buffers, and require mitigation. The mitigation measures associated with the wetlands and wetland buffers are described in Section 4.3.1.4.

4.2.1.6 Identification of Surface Water and Groundwater Users

{There are no users of onsite surface water. Johns Creek flows into the Patuxent River where there is recreational boating and fishing. Branch 1 and Branch 2 flow into Chesapeake Bay where there are also recreational boaters in addition to public beaches to the north and south of the CCNPP site. Commercial fisheries and recreational fishing also exist in Chesapeake Bay as discussed in Section 2.3.2.

Groundwater users in the vicinity of the CCNPP site are identified in Section 2.3.2. As described in Section 2.3.2, the nearest permitted Maryland Department of the Environment (MDE) groundwater well (beyond the boundary of the CCNPP property boundary and downgradient from the site), is conservatively presumed to lie adjacent to the southeastern boundary of the CCNPP site. At this location, the distance between the boundary and the center of CCNPP Unit 3 is approximately 1.1 mi (1.8 km) as shown in Figure 2.3.2-12. The flow direction was based on the regional direction of flow within the Aquia aquifer as shown in Figure 2.3.2-7.**}**

4.2.1.7 Proposed Practices to Limit or Minimize Hydrologic Alterations

{The following actions will be used to limit or minimize expected hydrologic alterations:

- Implementation of best management practices (BMPs) such as;
  - Maintaining clean working areas;
  - Removing excess debris and trash from construction areas;
  - Properly containing and cleaning up all fuel and chemical spills;
  - Installing erosion prevention devices in areas with exposed soils;
  - Installing sediment control devices at the edges of construction areas; and
  - Retaining and controlling stormwater and wash-down water onsite.
- Implementation of a Storm Water Pollution Prevention Plan (SWPPP)

The bio-retention ditches are designed to allow runoff to infiltrate. They will shift, slightly, the recharge areas for the Surficial aquifer. The amount of recharge may increase since there is less opportunity for evaporation and evapotranspiration. Monitoring of construction effluents and stormwater runoff will be performed as required in the stormwater pollution prevention plan, NPDES permit, and other applicable permits obtained for the construction.**}**

4.2.1.8 Compliance with Applicable Hydrological Standards and Regulations

{The regulations guiding the implementation of Best Management Practices (BMPs) are provided by the Maryland Department of the Environment (MDE, 1994). These regulations contain BMP installation instructions and typical construction activities which require BMPs. Monitoring of construction effluents and stormwater runoff will be performed as required in the stormwater pollution prevention plan, NPDES permit, and other applicable permits obtained for the construction.**}**

4.2.1.9 Best Management Practices

{The following BMPs will be implemented:

- Implementation of a SWPPP;
- Controlling site runoff;
- Monitoring runoff, groundwater, and surface water bodies for contaminants;

- Implementing controls, such as a spill prevention program, to protect against accidental discharge of contaminants (fuel spills, other fluids and solids that could degrade groundwater.

The bio-retention ditches are designed to allow runoff to infiltrate. They will shift, slightly, the recharge areas for the Surficial aquifer. The amount of recharge may increase since there is less opportunity for evaporation and evapotranspiration. Monitoring of construction effluents and stormwater runoff would be performed as required in the stormwater management plan, NPDES permit, and other applicable permits obtained for the construction.

In addition, CCNPP Unit 3 will comply with the requirements and conditions of the various permits issued to support construction. Environmental compliance personnel will monitor construction activities and provide direction to add, modify or replace site practices to ensure compliance with hydrological standards and regulations.**}**

In summary, the impact to hydrology is SMALL due to design of the surface water retention systems and use of best management practices to control surface water runoff.

4.2.2 WATER USE IMPACTS

This section discusses the proposed construction activities and resulting hydrologic alterations that could impact water use, an evaluation of potential changes in water quality resulting from construction activities and hydrologic changes, an evaluation of proposed practices to minimize adverse impacts, and compliance with applicable Federal, State and local environmental regulations.

4.2.2.1 Description of the Site and Vicinity Water Bodies

{The CCNPP site covers an area of approximately 2,057 acres (832 hectares) and is located on the western shore of Chesapeake Bay in Calvert County, Maryland near (MD) 2/4 as shown in Figure 2.1-2. Additional details on the CCNPP site location and surrounding area are provided in Section 2.1.

The surface water bodies, as shown in Figure 2.3.1-4, within the hydrologic system at the CCNPP site that may be affected by the construction and operation of CCNPP Unit 3 are discussed in Section 4.2.1.1.

Additional details on the surface water drainage and hydrology are presented in Section 2.3.1 and the Final Wetland Delineation Report (TTNUS, 2007).

The aquifers that could be impacted by project construction activities at the CCNPP site are the Surficial aquifer, the Chesapeake aquifer/confining unit, and the Castle Hayne-Aquia aquifer. These, and the other aquifers in the regional groundwater system, are described in Section 2.3.1 and Section 2.3.2. Site-specific hydrogeologic cross-sections are provided in Figure 2.3.2-5 and Figure 2.3.2-6.**}**

4.2.2.2 Hydrologic Alterations and Related Construction Activities

{Construction impacts to the existing surface water bodies are summarized as follows:

- Increasing runoff from the approximately 333 acres (135 hectares) of impervious and relatively impervious surfaces for the CCNPP Unit 3 power block pad, cooling tower pad, switchyard, permanent laydown, and parking areas;
- Infilling and eliminating the Camp Conoy Fishing Pond under the southeast portion of the laydown area south of the CCNPP Unit 3 power block foundation;

- Infilling and eliminating the upper reaches of Branch 2 and Branch 3, and an unnamed tributary to Johns Creek;
- Isolating portions of the upper reach of Branch 1 by construction of the laydown areas south of the CCNPP Unit 3 power block foundation;
- Disruption of the drainage in the Lake Davies dredge spoils disposal area with possible impacts on the two downstream impoundments;
- Wetlands removal and disruptions; and
- Possibly increasing the sediment loads into the proposed impoundments and downstream reaches.

The hydrologic alterations to groundwater that could result from the project related construction activities are:

- Creation of a local and temporary depression in the Surficial aquifer potentiometric surface due to dewatering for foundation excavations;
- Disruption of current Surficial aquifer recharge and discharge areas by plant construction. Hilly, vegetated areas would be cleared and graded; some streams and the Camp Conoy Fishing Pond (impoundment) would be backfilled and construction areas would be covered by less permeable materials and graded to increase runoff into bio-retention ditches. The locations of, or quantity of, water produced at springs and seeps could change downgradient of the construction areas;
- Stormwater runoff from the flat, non-vegetated foundation pads, switchyard and laydown areas would be directed and concentrated into bio-retention ditches and new impoundments that could affect recharge to the Surficial aquifer. Since the ditches and impoundments are unlined, they could act as smaller, focused recharge areas and might increase the amount of water recharging the surficial aquifer;
- Additional drawdown in the Aquia aquifer when the water needed for CCNPP Unit 3 construction is supplied by the CCNPP Units 1 and 2 onsite wells; and
- Minor shifting of the Surficial aquifer recharge area(s) to the underlying Chesapeake aquifer/confining unit.

A further discussion of related construction activities is provided in Section 4.2.1.2.**}**

4.2.2.3 Physical Effects of Hydrologic Alterations

{Impacts from the construction of CCNPP Unit 3 are similar to those associated with any large construction project. The construction activities that could produce hydrologic alterations to surface water bodies and groundwater aquifers are presented in Section 4.2.1.2. The potentially affected surface water bodies and groundwater aquifers are described in Section 4.2.1.4. The potential construction effects on surface water bodies and groundwater aquifers are presented in Section 4.2.1.5.

Surface Water Impacts

Because of the potential for impacting surface water resources, a number of environmental permits are needed prior to initiating construction. Table 1.3-1 in Chapter 1 provides a list of construction-related consultations and permits that have to be obtained prior to initiating construction activities.

The construction activities expected to produce the greatest impacts on the surface water bodies occur from:

- Reducing the available infiltration area;
- Grading and the subsequent covering of the 46 acre (19 hectare) CCNPP Unit 3 power block foundation;
- Grading and covering of the 18 acre (7 hectare) CCNPP Unit 3 cooling tower pad;
- Grading and covering of the 59 acre (24 hectare) CCNPP Unit 3 switchyard/substation;
- Vegetation removal and grading of 151 acres (61 hectares) for temporary construction laydown areas, concrete batch plant, offices, parking, warehouses, and shop preparation areas;
- Creation of impoundments;
- Elimination of an existing impoundment (i.e., Camp Conoy Fishing Pond); and
- Elimination of existing branches of Johns Creek.

Site grading and new building foundations will cover and reduce existing infiltration and recharge areas. Runoff will be directed into bio-retention ditches that could discharge to new impoundments, altering the Surficial aquifer recharge areas. Possible increases in runoff volume and velocity in the downstream creeks may cause erosion and adversely affect riparian habitat if not controlled.

Dewatering for the proposed foundation excavations could also impact surface water bodies. Effluent from the dewatering system, and any stormwater accumulating during the excavation, would be pumped to a stormwater discharge point or into onsite impoundments. If pollutants (e.g., oil, hydraulic fluid, concrete slurry) exist in these effluents from construction activities, they could enter the impoundments, downstream channel sections, or other surface water bodies. Monitoring of construction effluents and stormwater runoff would be performed as required in the stormwater management plan, NPDES permit, and other applicable permits obtained for the construction. Depending on the design of the stormwater impoundments and discharge systems, outflow rates into the surface streams could be altered.

All water bodies within the CCNPP site boundary could have the potential to indirectly receive untreated construction effluents. The water bodies listed in Section 4.2.1.1 are potentially subject to receiving untreated construction effluents directly. It will be necessary to implement proper BMPs under state regulations such as a: General NPDES Permit for Stormwater associated with Construction Activity, Erosion and Sediment Control Plan, and a stormwater pollution prevention plan. Table 1.3-1 lists and presents additional information on the Federal, State and Local Authorizations associated with this project.

If proper BMPs are implemented under these permits, treated construction effluents could be released to the site water bodies without adverse impacts. Flow rates for untreated construction effluents will depend upon the usage of water during site construction activities and the amount of precipitation contacting construction debris during construction activities. Flow rates and physical characteristics of the construction effluents are discussed in Section 4.2.1.4. A quantitative calculation and evaluation of the construction effluents and runoff will be done as part of the state construction permit process. BMPs would be implemented to control runoff, soil erosion, and sediment transport. Good housekeeping practices and engineering controls will be implemented to prevent and contain accidental spills of fuels, lubricants, oily wastes, sanitary wastes, etc.

BMPs are implemented under a Spill Prevention Plan, a SWPPP, and an Erosion Control Plan, as described in Section 4.2.1.7 and Section 4.2.2.10. Environmental control systems installed to minimize impacts related to construction activities will comply with all Federal, state and local environmental regulations and requirements. Once the initial controls are in place, they are maintained through the completion of construction and during plant operation, as needed.

Surface water use impacts are MODERATE, primarily due to the loss of wetlands and wetland buffers, and will require mitigation. The mitigation measures associated with the wetlands and wetland buffers are described in Section 4.3.1.4.

Groundwater Impacts

Depending on the design of the stormwater impoundments and discharge systems, outflow velocity and volume in the surface streams could change, and change the volume of water available to infiltrate and recharge the Surficial aquifer.

Increasing groundwater withdrawals for construction needs from the onsite Aquia aquifer production wells, could produce a local depression of the potentiometric surface in that aquifer. These increased withdrawals could potentially induce salt water intrusion or produce land subsidence, but as discussed earlier, neither had been reported as a significant problem in Calvert County or St. Mary's County.

The hydrologic alterations that could be produced in the groundwater aquifers are expected to be localized and possibly temporary. Most of the effects are expected to occur in the uppermost or Surficial aquifer. Any effects in the deeper aquifers are expected to be minor, due to remaining within the existing permit withdrawal limits, and dependent to a large extent on groundwater travel time, thickness and physical properties of the intervening stratigraphic units, and the nature of the hydraulic connection between aquifers.

The construction activities listed in Section 4.2.1.2 that are expected to produce the greatest impacts on the Surficial aquifer are related to:

- Changing the existing recharge and discharge areas;
- Possibly changing the amount of runoff available for infiltration; and
- Dewatering of foundation excavations during construction.

Site grading and leveling for the building foundations and laydown areas will cover and possibly eliminate existing recharge areas. Runoff from the graded areas will be directed into bio-retention ditches and several proposed impoundments, possibly creating new "focused" recharge areas. Runoff velocity may be increased in the channels downstream of the impoundments, which could decrease the amount of runoff available for infiltration and recharge. Fine-grained sediments could settle out in the impoundments and channels and create less-permeable areas for infiltration and recharge. These changes affect local recharge to the Surficial aquifer. Impacts on the deeper Aquia aquifer are likely to be SMALL.

Dewatering foundation excavations also produce localized impacts on the Surficial aquifer. The deepest excavations anticipated are for the proposed reactor and auxiliary building foundations, and extend approximately 40 ft (12 m) below plant grade. The dewatering system and activities are not expected to have any significant impact on the deeper Aquia aquifer due to the main recharge area of the Aquia aquifier is to the north. Hence, it is insensitive to perturbances of the Surficial aquifer. Effluent from the dewatering system will be pumped to a stormwater discharge point. Monitoring of construction effluents and stormwater runoff will be performed as required in the stormwater pollution prevention plan, NPDES permit, and other applicable permits obtained for the construction.

The locally lowered Surficial aquifer water level would be expected to eventually recover after the dewatering and other subsurface construction activities are complete.**}** Although it would be altered by buildings and paved areas, rainwater is still allowed to infiltrate in other plant areas to recharge the aquifier.

The impact to groundwater is SMALL and localized, changes to the surficial aquifer water level are expected to eventual recover once construction is complete.

4.2.2.4 Water Quantities Available to Other Users

{As described in Section 2.3.2.1.2, at present no surface water withdrawals are made in Calvert County for public potable water supply. Water use projection in Maryland for 2030 does not include surface water as a source for public water supply in southern Maryland counties including Calvert Country.

Groundwater use and trends in southern Maryland and at the CCNPP site are presented in Section 2.3.2.2 and in Section 2.4.12 of the Final Safety Analysis Report.

Water required for CCNPP Unit 3 construction is estimated at 250 gpm (946 lpm). This water is expected to come from the existing onsite wells into the Aquia aquifer at the CCNPP site. Any additional water needed is expected to come from offsite sources until the desalination plant begins operational and can supply the necessary water.

The Surficial aquifer is not used as a potable water source in the vicinity of the CCNPP site. The impacts expected from foundation dewatering or other construction activities will not impact any local users. The razing of the Camp Conoy facilities that are under the construction footprint may require abandonment of the four wells that supply those facilities. These wells draw from the Piney Point aquifer and have an appropriation limit of 500 gpd (1,900 lpd). The impact on the local area water supply resulting from the abandonment of these wells will be minor.**}**

4.2.2.5 Water Bodies Receiving Construction Effluents

{The surface water bodies directly downstream of the proposed construction activities could be impacted during clearing, grubbing, and grading. Locations of surface water and its users that could be impacted by construction activities are provided in Section 4.2.1.4.

Since most of the water for construction would be used for consumptive uses such as grading, soil compaction, dust control, and concrete mixing, little infiltration would be expected. Any effluents that might infiltrate would recharge the Surficial aquifer, and, potentially, the underlying Chesapeake aquifer/ confining unit, and the Castle Hayne-Aquia aquifer.

If contaminants enter the surface water bodies unchecked, there would be a potential for infiltration and subsequent groundwater contamination. If contaminants do enter groundwater, they may impact the quality of water withdrawn for industrial and commercial applications.

Any construction effluents infiltrating into the subsurface could potentially reach the Surficial aquifer if they are of sufficient volume and concentration. The plume migration would be downgradient and, depending on location, flow either eastward toward Chesapeake Bay or westward toward the Patuxent River. As described in Section 2.3.2, the horizontal groundwater flow in the Surficial aquifer is generally bi-directional. A northwest trending groundwater divide roughly follows a line extending through the southwestern boundary of the proposed power block area. Northeast of this divide, horizontal groundwater flow is northeast toward the Chesapeake Bay to small seeps and springs or onsite streams. Groundwater southwest of this divide flows to the southwest.

It is also possible that this groundwater could discharge locally at seeps or springs. Any possible impacts on deeper aquifers would also depend on the infiltrating volume and the hydrologic connection with the Surficial aquifer.

The composition of possible construction effluents that could infiltrate into the Surficial aquifer would depend on several factors related to the physical nature of the effluent material, i.e., solids versus liquids, solubility, vapor pressure, mobility, compound stability, reactivity in the surface and subsurface environments, dilution, and migration distance to groundwater. It is expected that proper housekeeping and spill management practices would minimize potential releases and volumes and physically contain any releases. Pesticides and herbicides are expected to be applied in limited site areas for insect and weed/brush control.

Several impoundments are planned to catch stormwater and sediment runoff from the various construction areas. Bio-retention ditches are planned to drain the proposed CCNPP Unit 3 power block, cooling tower pad, switchyard, and laydown areas. Modeling of the runoff from the probable maximum flood (PMF) during plant operation bounds the possible runoff amounts, characteristics, and impacts that might occur during construction due to unpaved surfaces during construction allowing for greater stormwater infiltration to ground. The retention ditches will discharge excess runoff into impoundments. The impoundments will be sized so as to prevent fast flowing, sediment laden stormwater from reaching the creeks or Chesapeake Bay prior to allowing the sediments to settle out. The flow velocities will be minimized to prevent erosion of creek and stream banks. The allowable flow rates and physical characteristics of stormwater runoff will be specified in State discharge permits.

Maximum runoff for the entire basin during the PMF is estimated at 21,790 cfs (617 cms). The maximum high water level elevation in Johns Creek is 65 ft (19.8 m) NGVD 29, which is below the approximate 84.6 ft (25.8 m) NGVD 29 elevation of the final site grade in the power block, switchyard, and cooling tower area.**}**

4.2.2.6 Baseline Water Quality Data

{Baseline water quality data for surface water bodies is provided and discussed in Section 2.3.3. A summary of the water quality data for the onsite surface water bodies is presented in Table 2.3.3-1. Baseline water quality data for groundwater is provided in Section 2.3.3.**}**

4.2.2.7 Potential Changes to Surface Water and Groundwater Quality

{The following section describes the potential water quality impacts resulting from the construction of CCNPP Unit 3.

The CCNPP site is a private facility and does not have any municipal water supplies. All water currently used onsite is drawn from Chesapeake Bay or subsurface aquifers. There are 13 groundwater supply wells onsite. The wells are listed in Table 2.3.2-6. Figure 2.3.2-13 shows the locations of the onsite supply wells. Four wells supply fresh water for CCNPP Units 1 and 2 operations; eight wells supply ancillary site facilities such as the rifle range and Camp Conoy. The Old Bay Farm well, identified in Table 2.3.2-6, is no longer in use.

Potential Changes to Surface Water Quality

Any potential surface water quality impacts are associated with the site clearing and grading activities.

The addition of sediment and organic debris to the local streams resulting from clearing, grubbing, and grading could decrease water quality. Organic debris could dam or clog existing streams, increase sediment deposition, and increase potential for future flooding. Organic debris decomposing in streams can cause dissolved oxygen and pH imbalances and subsequent releases of other organic and inorganic compounds from the stream sediments. Sediment laden waters are prone to reduced oxygen levels, algal growth, and increases in pathogens. If heavy metals or chemical compounds spill and/or wash into surface waters, there could be a direct toxicity to aquatic organisms. These potential pollutant releases could impact aquatic species and in turn affect the recreational aspects associated with fishing, canoeing, or kayaking.

The water bodies downstream of the proposed construction areas could be directly and indirectly affected by construction activities onsite. Construction debris residing on the pads and temporary staging areas could mix with construction wash-down water or stormwater, exit the site via untreated runoff and produce chemical reactions adverse to downstream ecology. Possible contaminants include: sediment, alkaline byproducts from concrete production, concrete sealants, acidic byproducts, heavy metals, nutrients, solvents, and hydrocarbons (fuels, oils, and greases). There could be a high potential for contaminants to mix with site wash-down water or rainwater/precipitation runoff and be washed downstream into surface water bodies existing on the CCNPP site due to the persistent nature of local precipitation. There could also be the potential for spills within the construction areas consisting of fuels, solvents, sealants, paints, or glues. Construction dusts not suppressed could drift outside of the construction zones and contaminate nearby water supplies. If these contaminants enter the surface water bodies unchecked there could be a potential for infiltration and subsequent groundwater contamination.

The proposed removal of onsite wetlands could reduce the ability of microbiotic organisms and fauna to naturally attenuate contaminants and pollutants produced onsite.

The impacts to surface water quality downstream of the construction site are SMALL due to the use of BMPs to control dust, runoff, and spills.

Potential Changes to Groundwater Quality

The spoils for CCNPP Units 1 and 2 were deposited in the dredge spoils disposal area of the site known as the Lake Davies area. Dredge spoils generated during the dredging of the barge slip area and construction of the intake/discharge structures may contain elevated levels of metals and salts. Runoff containing saline residue from the spoils could enter the impoundment just southeast of the spoils disposal pile, which is likely in direct hydraulic contact with the Surficial aquifer. Any impact on groundwater quality would probably be minor due to dilution. Little, if any, water quality impacts would be expected if this diluted water were to reach the deeper aquifers.

Dewatering for the foundation excavations may increase the oxidation of some sedimentary constituents by placing them in direct contact with the atmosphere. The oxides might have an increased solubility and could migrate down gradient when the potentiometric head is reestablished following construction completion. Possible impacts to the Surficial aquifer water quality would be SMALL and decrease with migration and dilution.**}**

4.2.2.8 Surface Water and Groundwater Users

{Surface water users downstream of the site may experience impacts from potential water quality changes if construction effluent concentrations and volumes are large enough and the release enters directly into a surface water body bypassing the overflow catch basins and retention ponds. The surface water users that could be impacted in the event of a release are those downstream of the CCNPP site along the tributaries flowing to the Patuxent River and

Chesapeake Bay. Any impacts to the larger surface water bodies receiving the discharge are expected to be minor.**}**

Groundwater users in vicinity of the CCNPP site are identified in Section 2.3.2.

4.2.2.9 Predicted Impacts on Water Users

{The impact of potential increased sediment loads in site runoff during construction would result in SMALL or no impacts to surface water users and affected areas.

Because groundwater from CCNPP Units 1 and 2 onsite wells will be used for construction, there might be impacts on local users that also make withdrawals from the Aquia aquifer.

Potential construction effluent impacts on aquifer groundwater quality would first be manifested in the Surficial aquifer. Construction activities are only expected to produce limited and temporary impacts in the Surficial aquifer. As described in Section 2.3.1, the Surficial aquifer is not used as a potable water source in the vicinity of the CCNPP site. Therefore, potential groundwater quality changes would not be expected to have any impact on possible users. Potential impacts to the deeper aquifers are dependant on the nature of the hydraulic connection between aquifers described in Section 4.2.1.1. Groundwater quality impacts on users of the deeper aquifer users are SMALL due to dilution and other contaminant attenuation effects that could occur along any effluent plume migration path.

The CCNPP site is located in U.S. EPA Region 3 (the District of Columbia, Delaware, Maryland, Pennsylvania, Virginia, and West Virginia). Six sole-source aquifers are identified in U.S. EPA Region 3 as shown in Figure 2.3.2-11. These are not located in southern Maryland. Thus, the addition of CCNPP Unit 3 is a SMALL impact to any sole source aquifer.**}**

4.2.2.10 Measures to Control Construction Related Impacts

The following measures will be taken to avoid runoff from the construction areas entering and potentially impacting downstream surface water bodies and groundwater, as applicable:

- Implementation of a SWPPP;
- Controlling runoff and potential spills using dikes, earthen berms, seeded ditches, and impoundments;
- Monitoring for contaminants within construction area impoundments and impoundments downstream of disturbed areas;
- Implementation of BMPs to protect against accidental discharge of contaminants (fuel spills, other fluids and solids that could degrade groundwater and surface water resources);
- Performing additional onsite surface and groundwater monitoring compared to established water quality benchmarks and historical site data; and

Bio-retention ditches are planned for the periphery of the power block, laydown, cooling tower and switchyard areas. The ditches are constructed of base materials that promote infiltration of runoff from low intensity rainfall events. However, for large storms the infiltration capacity of the base materials would be exceeded and the overflow pipes are provided to direct the runoff to the stormwater basins. The stormwater basins are unlined impoundments with simple earth-fill closure on the down stream end and include discharge piping to the adjacent watercourses.

Following the acquisition of the required permits and authorizations, site preparation activities include the installation or establishment of environmental controls to assist in controlling construction impacts to groundwater. These environmental controls include:

- Coffer Dams;

- Stormwater management systems;
- Spill containment controls;
- Silt screens;
- Settling basins; and
- Dust suppression systems.

These controls assist in protecting the **{**Surficial aquifer**}** by minimizing the potential for construction effluents to infiltrate directly into the subsurface or to carry possible contaminants to aquifer recharge areas.

Mitigation measures for barge slip dredging and construction activities in the area of the new intake structure and discharge outfall include:

- Restricting dredging only during certain times of the year to minimize impacts to aquatic species;
- Restricting dredging to only the areas identified for dredging;
- Installing a silt curtain around each dredge or active dredge area to minimize sediment release, as far as practicable, at the seabed/silt curtain interface and at the surface water level/silt curtain interface;
- Ensuring clam-shell dredges are fully closed and hoisted slowly to limit the amount of spillage;
- Not filling spoils barges to levels which will cause overflowing of materials during loading and moving;
- Not allowing vessel decks to be washed in such a way that allows material to be released overboard;
- Installing a sheet pile cofferdam and dewatering system to facilitate construction of the Unit 3 intake structure; and
- Carrying out water-quality monitoring in accordance with any permit requirements.

Additional measures to minimize or contain accidental releases of contaminants will be the establishment, maintenance, and monitoring of:

- Solid waste storage areas;
- Backfill borrow, spoils, and topsoil storage areas; and
- Site drainage patterns.

Groundwater monitor wells will be installed to assess gradient changes toward the excavation dewatering areas and potential groundwater quantity and quality changes.

Construction groundwater use impacts might be expected in the **{**Aquia aquifer and the groundwater withdrawals and potentiometric surface depression will be monitored. As mentioned in Section 4.2.1.1, salt water intrusion has not been identified as a problem in this area of Maryland.

As explained in Section 4.2.2.7, any contamination that might be introduced into the Surficial aquifer would be attenuated by the time it might reach deeper aquifers.**}**

4.2.2.11 Consultation with Federal, State and Local Environmental Organizations

The regulations guiding the implementation of Best Management Practices (BMPs) are provided by the **{**Maryland Department of the Environment (MDE, 1994)**}**. These regulations contain BMP installation instructions and typical construction activities which require BMPs. Monitoring of construction effluents and stormwater runoff would be performed as required in the stormwater management plan, NPDES permit, and other applicable permits obtained for the construction. The integrated permitting process for the applicable environmental permits will proceed concurrently with NRC review of the combined license application.

4.2.2.12 Compliance with Water Quality and Water Use Standards and Regulations

The regulations guiding the implementation of water quality and water use standards and regulations are provided by the **{**Maryland Department of the Environment (MDE, 1994)**}**. These regulations contain water quality and water use standards that must be adhered to during construction. In addition, site specific permits for various construction activities will contain conditions that must be complied with for the duration of the permitted activity.

4.2.2.13 Water Quality Requirements for Aquatic Ecosystems and Domestic Users

Section 4.3.2 discusses information pertaining to water quality requirements for aquatic ecosystems. **{**The USEPA declared Chesapeake Bay an impaired water body in 1998 based on the Federal Water Pollution Control Act (USC, 2007) due to excess nutrients and sediments. The Chesapeake Bay water is required to meet federal regulatory water quality standards by 2010 (USC, 2007).**}**

Domestic users of groundwater need to meet the State water quality standards for potable water systems.

4.2.2.14 References

{MDE, 1994. 1994 Standards and Specifications for Soil Erosion and Sediment Control, Website: http://www.mde.state.md.us/Programs/WaterPrograms/SedimentandStormwater/erosionsedimentcontrol/standards.asp, Date accessed: March 14, 2007.

TTNUS, 2007. Final Wetland Delineation Report, for Proposed UniStar Nuclear Project Area, Calvert Cliffs Nuclear Power Plant Site, Calvert County, Maryland, TetraTech NUS, May 2007

USC, 2007. Title 33, United States Code, Part 1251, Federal Water Pollution Control Act, 2007.

USGS, 2007. Hydrogeology of the Piney Point-Nanjemoy, Aquia, and Upper Patapsco aquifers, Naval Air Station Patuxent River and Webster Outlying Field, St. Mary’s County, Maryland, 2000-06, USGS Scientific Investigations Report 2006-5266, 26p, U.S. Geological Survey, C. Klohe and R. Kay, 2007.**}**

Table 4.2-1 Estimated Amounts of Fresh Water by Construction Year Needed for CCNPP Unit 3[f]
(Page 1 of 1)

Construction Year	1	2	3	4	5	6
People	8,550,000[a] gal (32,365,000 L)	25,650,000[b] gal (97,096,000 L)	25,650,000[b] gal (97,096,000 L)	25,650,000[b] gal (97,096,000 L)	25,650,000[b] gal (97,096,000 L)	
Concrete Mixing and Curing[c]	2,219,844 gal (8,403,000 L)	2,219,844 gal (8,403,000 L)	2,219,844 gal (8,403,000 L)	2,219,844 gal (8,403,000 L)	2,219,844 gal (8,403,000 L)	
Dust Control[d]	11,400,000 gal (43,154,000 L)	11,400,000 gal (43,154,000 L)	11,400,000 gal (43,154,000 L)	11,400,000 gal (43,154,000 L)	11,400,000 gal (43,154,000 L)	
Subtotal	22,169,844 gal (83,922,000 L)	39,269,844 gal (148,650,000 L)	39,269,844 gal (148,650,000 L)	39,269,844 gal (148,650,000 L)	39,269,844 gal (148,650,000 L)	26,179,896[e] gal (99,102,000 L)

Notes:

(a) Estimated at 1,000 persons using 30 gal (113.6 L) per day for 285 days per year.

(b) Estimated at 3,000 persons using 30 gal (113.6 L) per day for 285 days per year.

(c) Estimated at 6,700 cubic yards (5,122.5 m^3) per month using 27.61 gal (104.5 L) per cubic yard and 12 months per year.

(d) Estimated at 40,000 gal (151,400 L) per day for 285 days per year.

(e) Estimated at two-thirds of the amount used in any year 2 through 5.

(f) Water for construction would largely come from the existing onsite groundwater production wells. For construction years 1-4, the construction water would be supplied by a combination of onsite well water, trucked in supply, and storage tanks. The desalinization plant would be operational to meet freshwater supply needs during construction years five and six.

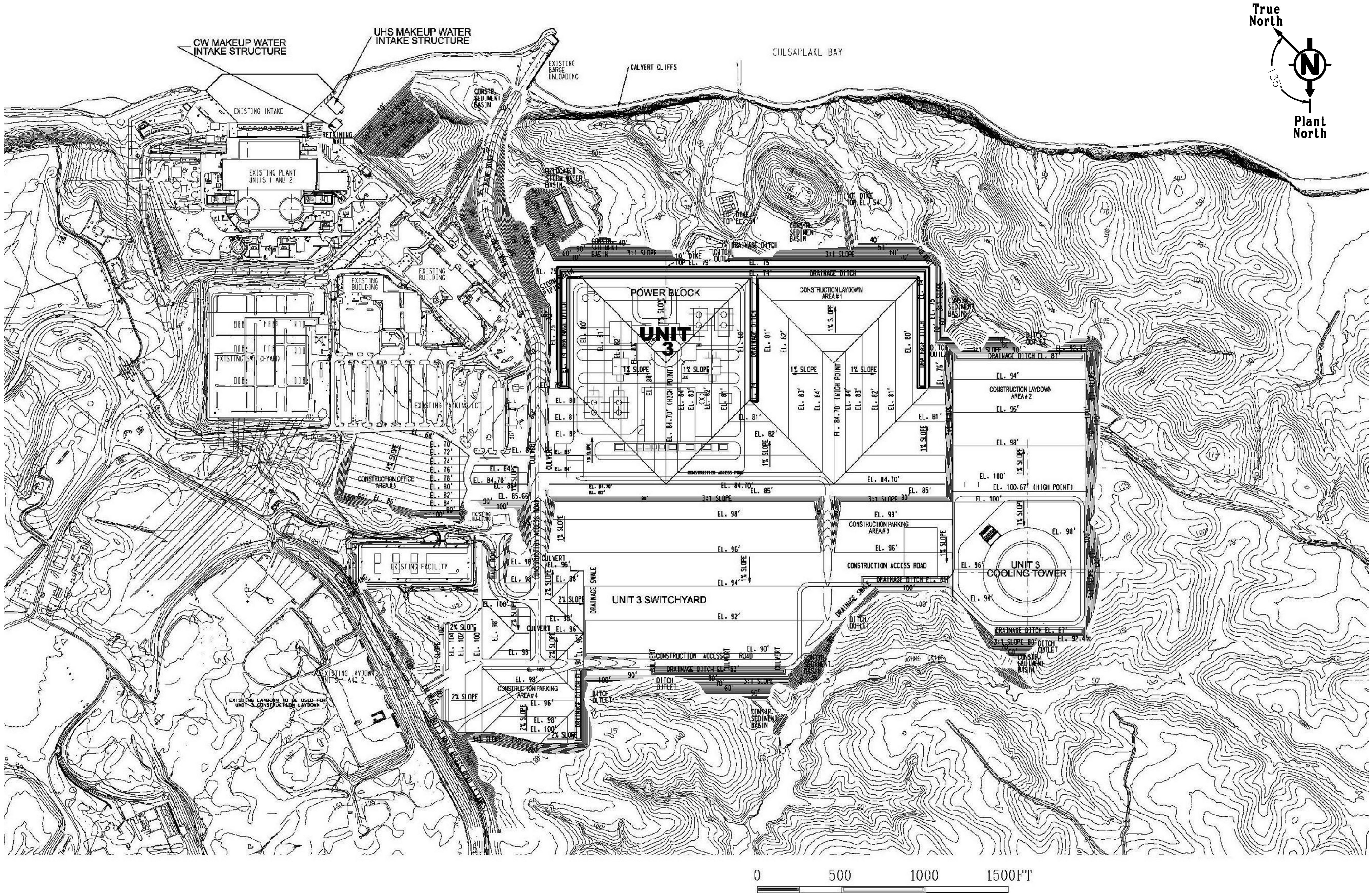

FIGURE 4.2-1 **Rev. 2**

FINAL SITE GRADING PLAN

{CCNPP UNIT 3}

CCNPP UNIT 3 ER

4.3 ECOLOGICAL IMPACT

4.3.1 TERRESTRIAL ECOSYSTEMS

{This section describes the impacts of construction on the terrestrial ecosystem. Construction would require the permanent or temporary disturbance of approximately 435 acres (176 hectares) of terrestrial habitat on the CCNPP site as shown in Figure 4.3-1. This area is assumed to be the maximum area of soil to be exposed at any time. Approximately 264 acres (107 hectares) of the affected terrestrial habitat would be permanently converted to structures, pavement, or other intensively-maintained exterior grounds to accommodate the proposed power block, cooling tower, switchyard, roadways, permanent construction laydown area, borrow area, retention basins, and permanent parking lots. The remaining disturbed area of approximately 171 acres (69 hectares) would be only temporarily disturbed to accommodate the batch plant, temporary construction laydown areas, temporary construction offices and warehouses, and temporary construction parking. The temporarily disturbed habitats would be restored to a naturally vegetated condition once construction activities are complete. The permanent loss of affected terrestrial habitat of 264 acres (107 hectares) is small compared to the 1,796,718 acres (724,242 hectares) in the region as shown in Table 2.2.3-1. Approximately 11 acres (4.5 hectares) of the lost terrestrial habitat is wetlands compared to 240,288 acres (97,245 hectares) of wetlands in the region as shown in Table 2.2.3-1. Figure 2.2.1-1 shows the CCNPP site boundary and the major buildings to be constructed. Figure 4.3-2 shows the land to be cleared, the waste disposal area and the construction zone.

Dredging will take place at the barge area to accommodate delivery of large components. Dredging will also be performed to allow for construction of the discharge line from the circulating water system. Dredged material will be disposed of in the previously used disposal area know as Lake Davies.

The construction footprint was designed to minimize impacts to terrestrial ecosystems, specifically lands within the Chesapeake Bay Critical Area (CBCA), which encompasses lands within 1,000 ft (305 m) of the mean high tide level on the shoreline; locations of federally-designated or state-designated threatened or endangered species; wetlands; wetland buffers designated by Calvert County; and forest cover, especially riparian forests, forested slopes, and large blocks of contiguous forest that provide habitat for forest dwelling species forest interior dwelling species (FIDS).

The proposed footprint of construction within the CBCA would be limited to approximately 30.3 acres (12.3 hectares), including approximately 0.4 acres (0.16 hectares) in the CBCA Buffer (extending 100 ft [30.5 m] landward of mean high tide) and approximately 29.9 acres (12.1 hectares) in the remainder of the CBCA. The CBCA encroachment is due to the water intake structures and pipelines, the discharge pipelines, the heavy haul road from the barge dock, stormwater retention basins, and security fencing. The affected land within the CBCA has already been designated by Calvert County as an intensively developed area (IDA) due to the presence of a barge dock serving the existing CCNPP Units 1 and 2.

None of the sandy cliff or beach areas on the CCNPP site that provide suitable habitat for the puritan tiger beetle or northeastern beach tiger beetle will be disturbed because their habitat is north of the construction footprint. No construction will take place within 1,500 ft of three bald eagle nests known to occur on the CCNPP site. However, a new bald eagle nest first observed within the construction footprint in 2007 may have to be mitigated after consultations and in agreement with the appropriate agencies.

It is not possible to construct the proposed facilities without adversely impacting terrestrial ecosystems, including wetlands, wetland buffers designated by Calvert County, and FIDS habitat. Construction activities will start after the State of Maryland issues the appropriate permits to start clearing and grading of the site. Activities to construct nonsafety-related systems and structures are expected to begin December 2009. Construction is expected to be complete by July 2015.**}**

4.3.1.1 Vegetation

{Plant Communities and Habitats: Clearing and grubbing would result in the vegetation losses shown in Figure 4.3-1 and summarized in Table 4.3.1-1. The losses would include approximately 191 acres (77 hectares) of mature forest cover consisting of well developed tree canopy and understory strata and dominant trees over 12 in (30 cm) in diameter at breast height (DBH), including:

- Approximately 179 acres (72 hectares) of mixed deciduous forest,
- Approximately 1.4 acres (0.6 hectares) of well-drained bottomland deciduous forest, and
- Approximately 11 acres (4.5 hectares) of poorly drained bottomland deciduous forest.

The losses would also include approximately 61 acres (25 hectares) of younger, fast growing forest cover, including:

- Approximately 48 acres (19 hectares) of mixed deciduous regeneration forest, and
- Approximately 13 acres (5 hectares) of successional hardwood forest.

Other vegetation losses would include:

- Approximately 125 acres (51 hectares) of old field vegetation,
- Approximately 3.3 acres (1.3 hectares) of herbaceous marsh vegetation,
- Approximately 51 acres (21 hectares) of lawns, and
- Approximately 3 acres (1.2 hectares) of shallow water with submerged vegetation (Camp Conoy Fishing Pond).

As indicated in Table 4.3.1-1, each of the affected types of vegetation is common throughout the CCNPP Site.

The boundaries of vegetated areas subject to clearing and grubbing will be prominently marked prior to site preparation. Merchantable timber within marked areas may be harvested prior to site preparation. Merchantable timber occurs only in areas of mixed deciduous forest, well-drained bottomland deciduous forest, and poorly drained bottomland deciduous forest. Remaining trees will then be felled. Stumps, shrubs, and saplings will be grubbed, and groundcover and leaf litter will be cleared to prepare the land surface for grading. Felled trees, stumps, and other woody material would be disposed of by burning, chipping and spreading the wood chips, and/or sent to an offsite landfill. Opportunities to recycle woody material for use elsewhere on the CCNPP site or for sale to the public may be considered. Recycling opportunities could include cutting logs into firewood, using wood chips to mulch landscaped areas, using logs to line pathways, piling logs and brush in open fields to improve terrestrial wildlife habitat, and placing stumps (root wads) in stream channels to prevent bank erosion and enhance aquatic habitat.

Because of the need for grading broad contiguous areas of land to construct the power block, switchyard, and cooling tower, there will be no practicable opportunities to preserve individual trees within those areas. However, a biologist would examine forested areas subject to clearing for the temporary construction parking areas, construction office and warehouse area, and construction laydown areas for aesthetically outstanding trees or clusters of trees that might be capable of preservation without interfering with construction activities. Only trees where a minimum of 70% of the critical root zone can be left ungraded without interfering with construction activities would be identified for preservation. The critical root zone is defined by the Maryland Department of Natural Resources (MDNR) as a circular zone surrounding a tree trunk with a radius of 1 ft (0.3 meter) for each inch DBH (and a minimum radius of 8 ft (2.4 m) (MDNR, 1997). The critical root zone would be marked consistent with the State Forest Conservation Technical Manual (MDNR, 1997).

Silt fences will be erected around the perimeter of the construction footprint to reduce the potential for sedimentation of adjoining vegetated areas. Detailed specifications for the silt fences and vegetative stabilization will be presented in a soil erosion and sediment control plan approved by the MDE prior to site disturbance. Soil piles will be covered with plastic or bermed until removed during backfill and final grading activities. Monitoring of construction effluents and storm water runoff will be performed as required by the Storm Water Management Plan, the NPDES permit, and other applicable permits obtained for construction.

Important Habitats: The construction footprint was designed to minimize encroachment into habitats identified in Section 2.4.1 as important. Three habitats on the CCNPP Site were identified as important. Poorly drained bottomland deciduous forest and herbaceous marsh vegetation meet the definition of wetlands protected under federal and state regulations. Well-drained bottomland deciduous forest is important because of its occurrence in riparian settings. Site preparation will result in the permanent loss (filling) of approximately 17 acres (6.9 hectares) of wetland habitats, including approximately 11 acres (4.5 hectares) of poorly drained bottomland deciduous forest, approximately 3 acres (1.2 hectares) of herbaceous marsh vegetation, and approximately 3 acres (1.2 hectares) of shallow open water in the Camp Conoy fishing pond supporting submerged vegetation. Site preparation also results in the permanent loss of approximately 1.4 acres (0.6 hectares) of well-drained bottomland deciduous forest. Wetland impacts are discussed in more detail in Section 4.3.1.3.

Important Plant Species: The chestnut oak, tulip poplar, mountain laurel, and New York fern were identified in Section 2.4.1 as important because they are key contributors to the overall structure and ecological function of forested plant communities on the CCNPP site. Chestnut oak, which is dominant or codominant in the canopy throughout most of the mixed deciduous forest on the CCNPP site, is a slow growing tree species that is difficult to grow and transplant (Hightshoe, 1988). Similarly hard to grow species common in the mixed deciduous forest on the CCNPP site includes white oak, bitternut hickory, and pignut hickory (TTNUS, 2007a). Mountain laurel, which forms a dense understory over much of the mixed deciduous forest (TTNUS, 2007b), is also a slow growing species and is difficult to transplant (Hightshoe, 1988). Even though mixed deciduous forest can be replanted, several hundred years could be necessary to restore the oaks, hickories, and mountain laurel to their present sizes in the restored forest cover. Any losses of cover by these species, even in areas of only temporary disturbance where forest vegetation can be replanted, must therefore be considered effectively permanent.

The showy goldenrod, Shumard's oak, and spurred butterfly pea were identified in Section 2.4.1 as important because they are listed by the State of Maryland as threatened or rare. Spurred butterfly pea was observed during a rare plant survey conducted in 2006 only in areas outside of the proposed construction footprint (TTNUS, 2007b) and therefore will not be adversely affected. Shumard's oak was observed outside of but very close to within 50 ft (15 m) the western edge of the proposed construction area for the cooling tower. The observed specimens of Shumard's oak do not have to be cut down to allow site preparation, but portions of their root systems could experience compaction or other physical disturbances. Careful protection of trees at the edge of the cooling tower construction area will be necessary to prevent mortality of the observed Shumard's oak specimens. Clusters of showy goldenrod (listed as threatened by Maryland) were observed in the 2006 surveys within the proposed construction footprint for the power block, at the edges of forested areas within Camp Conoy (TTNUS, 2007d). The clusters of showy goldenrod will be transplanted to open field areas outside of the construction footprint.

4.3.1.2 Fauna

{The vegetation losses summarized in Table 4.3.1-1 will reduce the habitat available to mammals, birds, and other fauna that inhabit the CCNPP Site and surrounding region. Some smaller, less mobile fauna such as mice, shrews, and voles could be killed by heavy equipment used in clearing, grubbing, and grading. Larger, more mobile fauna will be displaced to adjoining terrestrial habitats, which could experience temporary increases in population density of certain species. If the increases exceed the carrying capacity of those habitats, the habitats could experience degradation and the displaced fauna could compete with other fauna for food and cover, resulting in a die-off of individuals until populations decline to below the carrying capacity. Potential impacts to specific fauna species identified in Section 2.4.1 as important are discussed below.

White-tail Deer: White-tail deer, which are identified in Section 2.4.1 as important because of their recreational value to hunters, are abundant throughout the CCNPP site (TTNUS, 2007c) and throughout Maryland. Deer populations have generally increased rather than decreased as Maryland and Virginia have become more densely developed (Fergus, 2003). When deer populations exceed the carrying capacity of forested habitats, as is common in Maryland and Virginia, shrubs and saplings can be killed or stunted by over-browsing (Fergus, 2003). Although some CCNPP personnel have noticed browse damage to understory forest vegetation on the CCNPP site, the damage is not yet severe (TTNUS, 2007c). Displaced deer can be expected to cause greater browsing and trampling of the understory of forested areas surrounding the proposed construction. The effects from increased browsing by displaced deer could be at least partially offset by increased hunting in public lands to the north and south.

Scarlet Tanager and Other Forest Interior Dwelling Species (FIDS): The scarlet tanager was identified as important because it represents one of several MDNR-designated FIDS (listed in "A Guide to the Conservation of Forest Interior Dwelling Birds in the Chesapeake Bay Critical Area" (CAC, 2000)) observed on the CCNPP Site in 2006 (TTNUS, 2007c). The construction footprint was designed to minimize fragmentation of forest cover to the extent possible. The proposed power block will be situated in an area where the forest cover has already been fragmented by the lawns and playing fields of Camp Conoy. The proposed batch plant, construction laydown areas, construction office and warehouse area, and construction parking area will be situated in areas where the forest cover has already been fragmented by former agricultural fields, dredge spoil disposal, and existing roadways. Construction of CCNPP facilities will not substantially contribute to increased fragmentation of forest cover or loss of habitat for the scarlet tanager or other FIDS.

Construction of the proposed switchyard, cooling tower, and construction offices and warehouses would encroach into areas of unfragmented forest north and east of the headwaters to Johns Creek and south of Camp Conoy. The only alternative to siting the facilities in the forested areas west and south of the proposed power block location would be to site them to the east, which would encroach into the CBCA. Construction of the facilities would therefore reduce the availability of suitable habitat in the region to the scarlet tanager and other FIDS. However, the reduction would be minimized because the forest clearing would take place in blocks beginning at the edge of the forested landscapes rather than as clearings or strips that encroach deeper into the forest interior.

Bald Eagle: The bald eagle was identified as important because of its status as a federal and state listed threatened species. Three known bald eagle nesting sites were present on the CCNPP site in 2006, although one nest was determined in 2007 to no longer be active (TTNUS, 2007c). The proposed construction footprint does not encroach within a 1,500 ft (457 meter) circular setback surrounding each of the three nesting sites. However, bald eagles established a new nest after the 2006 breeding season in a tree adjoining a ball field in Camp Conoy (Figure 2.4-2). The new nest was first observed in April 2007. Two adult bald eagles were observed circling the nest, suggesting that it was active. Because the nest is located within an area that will be impacted by construction, the Maryland Department of Natural Resources and U.S. Fish and Wildlife Service will be consulted regarding avoidance and appropriate mitigation measures.

Puritan Tiger Beetle and Northeastern Beach Tiger Beetle: The proposed construction activities would have no potential to affect the puritan tiger beetle or northeastern beach tiger beetle, which were identified as important because of their federal threatened status. Both species have highly specific habitat requirements that limit their potential occurrence on the CCNPP site to the sandy cliffs adjoining undeveloped shoreline stretches of the Chesapeake Bay (USFWS, 1993; USFWS, 1994). No construction activities would take place on or within 500 ft (152 m) of any cliff or beach habitats which are all located further south of CCNPP Units 1 and 2. The proposed intake and discharge pipelines and heavy haul road have been routed to impact the Chesapeake Bay shoreline at either the existing CCNPP Units 1 and 2 intake structure or just to the south near the barge slip where the shoreline consists of armored fill soil, a habitat unsuitable for either tiger beetle species.

The results of the 2006 survey (Knisley, 2006) indicated that the work proposed at the CCNPP site will not have any effect on the puritan or northeastern beach tiger beetles or their habitats. However, since the beach south of the barge slip is favorable habitat for the puritan tiger beetle, mitigation measures will consist of administrative controls such as posting signage or fencing off the beach south of the barge slip area, to restrict personnel access.

Bird Collisions: The tallest structure constructed as part of CCNPP Unit 3 is the cooling tower, with a height of 164 ft (50 m). The tower will be the tallest structure in the vicinity, which is predominantly rural. Assuming a tree canopy height of approximately 80 ft (24 m), the tower would protrude 84 ft (36 m) over the surrounding tree canopy. Because the tower would be constructed at a location with a ground surface elevation of 120 ft (37 m) above mean sea level (USGS, 1987), its top would be approximately 284 ft (86 m) above mean sea level, and hence 284 ft (86 m) above the water surface of the Chesapeake Bay.

Some bird mortality would likely result from collisions with the cooling tower, but the expected mortality would be low and unlikely to significantly affect populations of migratory bird species. There are few published data regarding bird collision mortality with cooling towers. However, research was conducted in the early 1970s on the potential for bird collisions with cooling towers at the Davis-Besse Nuclear Power Station. Over 80 bird mortalities were reported in 1973 due to collisions with a 495 ft tall cooling tower constructed on the southeast shore of Lake Erie as part of the Davis-Besse Nuclear Power Station (Rybak, 1973). However, the Davis-Besse tower is 495 ft in height, more than 350 ft taller than the proposed CCNPP cooling tower.

Monitoring conducted at the Davis-Besse Nuclear Power Station between Fall 1972 and Fall 1979 revealed a total of 1,561 bird carcasses, of which 78.7% (approximately 1,229 carcasses) were attributed to collisions with the cooling tower. Most of the carcasses were species that migrate at night such as warblers (Family *Parulidae*), vireos (Family *Vironidae*), and kinglets (Family *Sylvidae*) (Temme, 1979). Many warbler and vireo species are suffering substantial population declines due at least in part to forest fragmentation (Askins, 2000) and have been identified as FIDS by the MDNR (CAC, 2000). Substantial numbers of warblers, vireos, and kinglets likely migrate through the extensive forested lands on and around the CCNPP site, and warblers of multiple species as well as the red-eyed vireo (*Vireo olivaceus*) were observed on the CCNPP site in 2006 (TTNUS, 2007c). Some individual warbler and vireo mortality events due to collisions with the cooling tower must therefore be expected. Due to the low height of the proposed cooling tower, the mortality should not have an adverse effect on populations of any bird species. Measures such as reducing the lighting on the cooling tower to the minimum required by the Federal Aviation Administration and using flashing lights instead of floodlights have been shown to be effective in reducing the incidence of bird collisions (Ogden, 1996).

The construction of the onsite transmission lines could injure birds if they collide with the new conductors or towers or by electrocution if birds with large wingspans contact more than one conductor (i.e., cross phases). However, the transmission line connections will be constructed in, and adjoining other developed areas, and would not fragment natural bird habitats. Regularly occurring noise from human activity will also discourage frequent visitation by birds. The new towers would not be higher that the existing towers on the CCNPP site, and thus would be no more likely to increase bird collisions than the existing towers.

No new offsite transmission corridors and no offsite areas are impacted since no changes are required to the existing transmission lines or towers.**}**

4.3.1.3 Wetlands

{The construction footprint for the proposed facilities has been designed to minimize encroachment into areas delineated as wetlands or other waters of the U.S. However, construction of the proposed facilities would not be possible without permanently filling approximately 12,590 linear feet (3,837 m) of intermittent and upper perennial stream channels and approximately 18.6 acres (7.5 hectares) of the delineated areas (Table 4.3.1-2). The project would therefore require an individual permit under Section 404 of the Federal Water Pollution Act (USC, 2007) from the Baltimore District of the U.S. Army Corps of Engineers (USACE). The project does not qualify for approval under the Maryland Programmatic General Permit because of the extent of the affected regulated areas and because constructing the intake and discharge pipelines and dredging to allow larger vessels to access the existing CCNPP barge slip requires work within the traditionally navigable waters of the Chesapeake Bay.

Because all of the affected wetlands are non-tidal, the project would also require a permit from the Maryland Department of the Environment (MDE) under the Maryland Non-tidal Wetlands Protection Act (COMAR, 2005). The project would also disturb approximately 48 acres (19.4 hectares) of land defined as non-tidal wetland buffer by Calvert County under the Maryland Non-tidal Wetlands Protection Act (COMAR, 2005). Non-tidal wetland buffer is defined by Calvert County as lands within 50 ft (15 m) of the landward (up-gradient) edge of non-tidal wetlands, as delineated using the federal methodology. The act also regulates expanded non-tidal wetland buffers extending as far as 100 ft (30.5 m) from the landward edge of Wetlands of Special State Concern. However, no Wetlands of Special State Concern have been identified for the CCNPP site. The permits and authorizations required for the project are presented in Section 1.3.

Most of the wetland fill would take place in Wetland Assessment Areas I, II, IV and VII described in the wetland delineation report (TTNUS, 2007d). Only small areas of wetlands would be filled in Wetland Assessment Areas V or VI. None of the wetlands directly adjacent to Johns Creek (in Wetland Assessment Area V) or Goldstein Branch (in Wetland Assessment Area VII) would be filled, although some wetlands adjacent to headwaters to those streams would be filled. No wetlands or non-tidal wetland buffers would be disturbed in Wetland Assessment Area III, which is located more than 500 ft (152 m) south of where the permanent laydown area south of the power block would be constructed, or Wetland Assessment Area VIII, which is located more than 500 ft (152 m) north of where the construction access road would be constructed.

Wetland Assessment Area I: Grading to construct the power block and heavy haul road will fill 0.92 acres (0.37 hectares) of Wetland Assessment Area I. Most of the fill would encompass approximately 2,160 linear feet (658 m) of intermittent and upper perennial stream channels and adjacent forested wetlands, totaling 0.90 acre (0.36 hectares). The affected stream channels have been deeply scoured by surface runoff and are adjoined by very narrow strips of forested wetlands that are less than 5 ft (1.5 m) in width and bounded by steep, eroding banks (TTNUS, 2007d). Grading to build the heavy haul road would also require filling approximately 0.02 acres (0.01 hectares) of open water at the southern edge of an existing stormwater retention basin near the barge dock. Construction activities will also disturb 6.45 acres (2.61 hectares) of uplands within 50 ft (15 m) of Wetland Assessment Area I designated as non-tidal wetland buffer by Calvert County. The affected buffer consists mostly of undeveloped forested land. Because the structural components of the power block must be closely spaced over an evenly graded surface for effective operation, it is not possible to fragment the pad to allow preservation of the stream or wetlands.

Approximately 0.40 acres (0.16 hectares) of the affected portions of Wetland Assessment Area I are located in the CBCA. However, none lie within 100 ft (30.5 m) of mean high tide on the Chesapeake Bay shoreline (the CBCA Buffer). Construction within the CBCA, including the eastern (down-gradient) portions of Wetland Assessment Area I, is necessary to connect the proposed power block to an existing barge dock that presently serves CCNPP Units 1 and 2.

The losses of the wetland features in Wetland Assessment Area I would not represent a substantial loss in terms of wetland functions or values. Wetland functions are physical, chemical, and biological processes or attributes of wetlands that are vital to the integrity of a wetland system, independent of how those benefits are perceived by society. Wetland values are attributes that are not necessarily important to the integrity of a wetland system but which are perceived as valuable to society (Adamus, 1991). A functional assessment included in the wetland delineation report (TTNUS, 2007d) identified only two functions (and no values) present in Wetland Assessment Area I: groundwater recharge/discharge and wildlife habitat. Neither was identified as principal, i.e., of high importance to regional ecosystems or society at a local, regional, or national level. The low number of functions and values identified for Wetland Assessment Area I generally reflects the severely eroded and scoured condition of the stream channels and banks, the narrowness of the adjacent vegetated wetlands, and proximity to existing developed areas associated with CCNPP Units 1 and 2 (TTNUS, 2007d).

Wetland Assessment Area II: Preparation of the proposed permanent construction laydown area south of the power block will fill 4.95 acres (2.0 hectares) of Wetland Assessment Area II. Filled areas will include 2.66 acres (1.08 hectares) of open water comprising the Camp Conoy Fishing Pond as well as approximately 0.78 acres (0.32 hectares) of emergent wetlands and 1.50 acres

(0.6 hectares) of forested wetlands fringing the pond and the adjoining 1,150 linear feet (351 m) of intermittent and upper perennial stream channels flowing into or out of the pond. Construction would also disturb 7.18 acres (2.91 hectares) of uplands within 50 ft (15 m) of Wetland Assessment Area II designated as non-tidal wetland buffer by Calvert County. The affected buffer consists mostly of undeveloped forested land.

Impacts to Wetland Assessment Area II would be within the CBCA, but will be 0.35 acres (0.14 hectares) limited to the most landward (westernmost) 200 ft (61 m) of the CBCA. Approximately 0.85 acre (0.34 hectares) of uplands, all undeveloped forest land, in the CBCA designated by Calvert County as non-tidal wetland buffer would be impacted. No areas of Wetland Assessment Area II within 800 ft (244 m) of the Chesapeake Bay will be impacted, including the two small impoundments on the stream flowing northeast from the Camp Conoy Fishing Pond to the Bay.

Although the power block could be constructed without disturbing Wetland Assessment Area II or its associated non-tidal wetland buffer, relocating the proposed construction laydown area to a more distant upland location will require transporting workers and equipment over distances greater than one mile (1.6 km) on a regular basis. The laydown area will be graded to a size, shape, and grade suitable for use for a laydown area during construction and as needed for operation. It may be possible to reconfigure the proposed permanent laydown area to avoid some of the affected wetlands or buffer. However, the area would then not be suitable for future use as a laydown area during plant operation.

The evaluation of wetland functions and values included in the wetland delineation report (TTNUS, 2007d) identified seven functions (groundwater recharge/discharge, fish and shellfish habitat, sediment/toxicant retention, nutrient removal, production export, sediment/shoreline stabilization and wildlife habitat) and three values (recreation, educational/scientific value, and uniqueness/heritage) present in Wetland Assessment Area II. Of these, wildlife habitat and recreation have been identified as principal. Wildlife habitat was identified as a principal function because of the diversity of vegetative cover in the wetlands and adjoining uplands. Recreation was identified as a principal value because of the trails, dock, and other facilities at the Camp Conoy fishing pond. The loss of the wetlands and wetland buffer in Wetland Assessment Area II therefore represents a substantial reduction in the local availability of quality wildlife habitat. The loss of the Camp Conoy Fishing Pond constitutes the loss of an outdoor recreational facility that previously provided picnicking, fishing, and canoeing opportunities for Constellation employees and their guests.

Wetland Assessment Area III: No part of Wetland Assessment Area III or its associated on-tidal wetland buffer designated by Calvert County would be filled.

Wetland Assessment Area IV: Construction of the proposed switchyard will require filling 5.3 acres (2.1 hectares) of wetlands and other waters of the U.S. in Wetland Assessment Area IV, including approximately 4,870 linear feet (1,484 m) of intermittent and perennial wetland to Johns Creek and adjacent forested wetlands. The affected area includes intermittent and perennial stream channels, forested wetlands, and forested springs associated with a generally southwest-flowing headwater of Johns Creek. Construction will also disturb 15.3 acres (6.2 hectares) of uplands within 50 ft (15 m) of Wetland Assessment Area IV designated as non-tidal wetland buffer by Calvert County. The affected buffer consists mostly of undeveloped forest land. The wetland and wetland buffer impacts are unavoidable because the switchyard must be constructed adjacent to the power block.

Lands east of the power block are in the CBCA, lands south are needed for the cooling tower and laydown area, and lands north contain existing facilities. Hence, the only practicable location for the switchyard is west of the power block. The need for closely clustering the switchyard facilities over a contiguous, evenly graded area would prevent preserving the subject stream channels, springs, and wetlands. Construction of a 500 kV transmission line from the proposed switchyard to the existing 500 kV transmission line on the CCNPP site will require clearing trees in 0.31 acres (0.13 hectares) of additional forested wetlands in Wetland Assessment Area IV (adjoining approximately 520 linear feet (158 m) of intermittent stream channel), as well as in 1.85 acres (0.75 hectares) of additional forested uplands designated as non-tidal wetland buffer by Calvert County. No grading would be constructed in the subject wetlands or wetland buffer; disturbance would be limited to tree and shrub removal only. Surface soils within the affected wetlands and buffer will remain undisturbed, as would the pattern of surface runoff. The vegetation impacts to the affected wetlands and buffer are necessary because trees growing close to a 500 kV electric conductor must be removed to prevent possible outages. The transmission line is needed to convey electric power generated by the proposed power block to existing transmission lines that connect to the regional power grid.

The evaluation of wetland functions and values included in the wetland delineation report (TTNUS, 2007d) identified five functions (groundwater recharge/discharge, sediment/toxicant retention, nutrient removal, production export, and wildlife habitat) and three values (recreation, educational/scientific value, and uniqueness/heritage) present in Wetland Assessment Area IV. Of these, wildlife habitat and uniqueness/heritage were identified as principal. Wildlife habitat was identified as principal because of the presence of the wetlands within a large block of contiguous forest that provides habitat for FIDS. Uniqueness/heritage was identified as principal because of the fact that Johns Creek and its headwaters east of (MD) 2/4 represent one of the few stream systems in southern Calvert County that still remains largely free of development. The loss of the wetlands and wetland buffer in Assessment Area IV therefore represents a reduction in the local availability of quality wildlife habitat, including FIDS habitat, and a reduction in the availability of outdoor passive recreation facilities in the region.

<u>Wetland Assessment Area V</u>: No part of Wetland Assessment Area V or its associated non-tidal wetland buffer will be filled. The functional assessment included in the wetland delineation report (TTNUS, 2007d) identified more principal functions and values for Wetland Assessment Area V than for any other Wetland Assessment Area. The principal functions included wildlife habitat, fish and shellfish habitat, sediment/toxicant retention, nutrient removal, and production export. Uniqueness/heritage was identified as a principal value. Some key properties of Wetland Assessment Area V contributing to its functional superiority include the juxtaposition of forest and emergent wetland vegetation, the meandering and braided course of Johns Creek through the wetlands, and the extensive coverage by mature forest cover in the adjoining uplands. Avoiding encroachment into Wetland Assessment Area V and its associated non-tidal wetland buffers was therefore a key objective when selecting a route for the construction access road.

<u>Wetland Assessment Area VI</u>: Construction of a construction access road linking the power block to (MD) 2/4 will require filling 0.86 acre (0.35 hectares) of wetlands and other waters of the U.S. in Wetland Assessment Area VI. The affected area consists of 0.50 acre (0.20 hectares) of emergent wetland and 0.36 acre (0.15 hectares) of forested wetland comprising part of a former sediment basin associated with the Lake Davies dredged material disposal area. Construction will also disturb 1.12 acre (0.45 hectares) of uplands within 50 ft (15 m) of Wetland Assessment Area VI designated as non-tidal wetland buffer by Calvert County. The affected buffer consists mostly of undeveloped land supporting forest and old field vegetation. The access road was routed across the up-gradient (eastern) part of Wetland Assessment Area VI to avoid disturbing

wetlands closer to Johns Creek and to avoid encroaching into the uplands to the east needed for temporary construction laydown.

Construction impacts to Wetland Assessment Area VI will not result in a substantial loss of wetland values or functions. The evaluation of wetland functions and values included in the wetland delineation report (TTNUS, 2007d) identified five functions (sediment/toxicant retention, nutrient removal, production export, sediment/shoreline stabilization, and wildlife habitat) but no values for Wetland Assessment Area VI. None of the identified functions were reported to be principal. The former Lake Davies sediment basins are man-made features rather than natural wetlands and are infested throughout by dense growth of the non-native invasive grass phragmites (*Phragmites australis*), which is of low value as food or cover by wildlife. The phragmites cover extends over most of the emergent wetlands and under the tree canopy in most of the forested wetlands, as well as most of the 50 ft (15 m) wetland buffer.

<u>Wetland Assessment Area VII</u>: Construction of the construction access road, batch plant, and temporary construction laydown areas will require filling 5.16 acres (2.09 hectares) of wetlands and other waters of the U.S. in Wetland Assessment Area IV, including 3,200 linear feet (975 m) of headwaters to Goldstein Branch and adjacent forested wetlands. The affected area includes intermittent and perennial stream channels, forested wetlands, and forested springs associated with headwaters to Goldstein Branch, but construction will not involve disturbing the main channel of Goldstein Branch or its directly adjoining wetlands. Construction will also disturb 12.76 acres (5.16 hectares) of uplands within 50 ft (15 m) of Wetland Assessment Area VII designated as non-tidal wetland buffer by Calvert County. The affected buffer consists mostly of undeveloped forested land.

The evaluation of wetland functions and values included in the wetland delineation report (TTNUS, 2007d) identified five functions (groundwater recharge/discharge, sediment/toxicant retention, nutrient removal, production export, and wildlife habitat) and three values (recreation, educational/scientific value, and uniqueness/heritage) present in Wetland Assessment Area IV. Of these, wildlife habitat and uniqueness/heritage have been identified as principal. Wildlife habitat was identified as principal because of the presence of the wetlands within a large block of contiguous forest that provides habitat for FIDS. Uniqueness/heritage was identified as principal because of the fact that Johns Creek and its headwaters east of (MD) 2/4 represent one of the few stream systems in southern Calvert County that still remains largely free of development. The loss of the wetlands and wetland buffer in Assessment Area IV therefore represents a reduction in the local availability of quality wildlife habitat and a reduction in the availability of outdoor passive recreation facilities in the local region.

<u>Wetland Assessment Area IX</u>: Construction of the parking lot will require filling the entirety of Wetland Assessment Area IX (1.12 acres (0.45 hectares)), including 0.64 acres (0.26 hectares) of emergent wetlands and 0.48 acres (0.19 hectares) of forested wetlands. Wetland Assessment Area IX consists of 1,200 linear feet (366 m) of multiple springs and small fragments of intermittent stream channels and ditches within a small remnant area of forest land surrounded by existing roadways and parking lots. Construction will also disturb 3.34 acres (1.35 hectares) of uplands within 50 ft (15 m) of Wetland Assessment Area IX designated as non-tidal wetland buffer by Calvert County. The affected buffer consists of undeveloped forested land and mowed grassland adjoining existing roadways.

The affected wetlands and associated buffers are of low functional quality. The evaluation of wetland functions and values included in the wetland delineation report (TTNUS, 2007d) identified only one function (wildlife habitat) and one value (visual quality/aesthetics). Neither was identified as principal. While the isolated forest area, including its wetlands, might have some value as an “oasis” for wildlife traversing the existing developed areas west of CCNPP Units 1 and 2, its small size and proximity to areas of heavy human and vehicular use make it generally unattractive to most terrestrial wildlife. Surface flow in the wetlands is all directed into existing storm sewers rather than into natural streams, hence the opportunity for the wetlands to perform water quality functions or production export to aquatic food chains is minimal. The loss of Wetland Assessment Area IX therefore represents a minimal loss of wetland functions and values.

4.3.1.4 Other Projects Within the Area with Potential Impacts

Although not a project, Calvert County is redirecting future residential and commercial development into existing clusters of urban development termed “town centers” away from the CBCA, including the cliffs and beaches that provide potential habitat for the two tiger beetle species and bald eagles (CCPC, 2004).

The EIS for the other large energy facility development project planned for Calvert County, the Cove Point Liquefied Natural Gas (LNG) expansion project indicates that no cliff or other naturally vegetated Chesapeake Bay habitat would be impacted by the project (FERC, 2005). The EIS also indicates that the one bald eagle nest near a proposed pipeline crossing of the Patuxent River in western Calvert County could be impacted by the construction. The developer of the project, Dominion Cove Point LNG, LP, has committed to the U.S. Fish and Wildlife Service (USFWS) to implement appropriate mitigation measures.

Calvert County has experienced extensive fragmentation of forest cover and loss of FIDS habitat due to agricultural and suburban development. The Cove Point LNG expansion project would limit forest clearing in the county to lands directly adjacent to the LNG and ancillary facilities and areas to the side of existing pipeline right-of-way (FERC 2005) and is unlikely to diminish FIDS habitat.

4.3.1.5 Consultation

Affected Federal, State and Regional agencies will be contacted regarding the potential impacts to the terrestrial ecosystem resulting from plant construction. **{**The Maryland Natural Heritage Program, operated by the Maryland Department of Natural Resources, was consulted for information on known occurrences of Federally-listed and State-listed threatened, endangered, or special status species and critical habitats (Byrne, 2006). Identification of the important species discussed above was based in part on information provided by that consultation. The U.S Fish and Wildlife Service was consulted via letter dated April 12, 2007 and responded on May 22, 2007 stating that no federally protected, threatened, or endangered species are known to exist with the proposed project area except for the occasional transient species, but qualified the response by stating that “if additional information on the distribution of listed or proposed species becomes available, this determination maybe reconsidered (Ratnaswamy, 2007), The consultation occurred prior identification of the eagle in the project vicinity (Section 4.3.1.2) and additional consultation is planned as stated in Section 4.3.1.2. USFWS and the Maryland Department of Natural Resources will be provided an opportunity to review the Environmental Report.**}**

4.3.1.6 Mitigation Measures

Opportunities for mitigating unavoidable impacts to terrestrial ecosystems involve restoration of natural habitats temporarily disturbed by construction creation of new habitat types in formerly disturbed areas, as well as enhancement of undisturbed natural habitats. Mitigation plans will be developed in consultation with the applicable State and local resource agencies and will be implemented on the CCNPP site to the extent practicable. The description of mitigation measures is addressed below for upland areas (flora and fauna) and wetland areas.

{Flora and Fauna: Mitigation to replace temporary and permanent impacts to upland areas (Table 4.3.1-1) will consist of reforestation as well as development of other appropriate naturally vegetated areas (e.g., meadows, shrub/scrub communities). Some areas on the CCNPP site may be available for mitigation, including lawns and old agricultural fields. Consideration will be given to mitigation within the CBCA as well as areas further inland. Because the areas of projected forest losses in the CBCA are already fragmented by roads and lawns in Camp Conoy and the roadways and open areas adjoining the barge dock, reforestation within the CBCA will contribute to the State of Maryland's goal of increased FIDS habitat in the CBCA (CAC, 2000). In addition, UniStar will keep the remaining unforested upland, not impacted by the construction of Unit 3, as old field habitat to maintain site biodiversity and provide a suitable location to transplant the showy goldenrod for the Camp Conoy area.

The reforestation process is designed to ultimately generate a mixed deciduous forest. Mixed deciduous forest is the climax vegetation, i.e., the permanently-sustaining vegetation that would result following an extended period without disturbance, for uplands in central Maryland, including Calvert County. The process by which unvegetated land reverts to climax vegetation is termed natural succession. Left undisturbed, abandoned agricultural land in central Maryland typically passes through a series of intermediate forest stages termed seres. The initial series consist of vegetation dominated by grasses and other herbaceous plants; then vegetation dominated by shrubs and tree saplings; then forest vegetation dominated by Virginia pines and hardwoods such as black locust and black cherry that grow rapidly in conditions of full sunlight; and finally forest dominated by oaks, tulip poplars, and other hardwoods that can regenerate under their own shade. The initial two series correspond to the old field vegetation on the CCNPP site, the intermediate series corresponds to the successional hardwood forest, and the final (climax) series corresponds to the mixed deciduous forest. The mixed deciduous regeneration forest is the result of logging mixed deciduous forest without killing the stumps and associated root systems; it therefore consists of a mixture of stump sprouts of climax tree species and fast-growing successional tree species and is intermediate in character between mixed deciduous forest and successional hardwood forest.

An optimal mix of tree species for planting includes tulip poplar, sweet gum, green ash, black locust, Virginia pine, and loblolly pine. All are relatively fast growing when properly planted, are easily transplanted and widely available as nursery stock (Hightshoe, 1988), and are components of the existing successional hardwood forest and/or mixed deciduous forest on the CCNPP site (TTNUS, 2007b). Based on reported growth rates (Hightshoe, 1988), a stand planted with bare-root or 1-gallon container-grown nursery stock of the above species would form a closed canopy forest resembling the existing successional hardwood forest or mixed deciduous regeneration forest within 20 to 30 years. At that point, the stand will provide habitat for FIDS. The Matapeake soils mapped in the subject area have a reported site index of 75 to 85 for loblolly pine (USSCS, 1971).The site index indicates the expected height for planted loblolly pine after 50 years. Site index data are not available for the other species, but the data for loblolly pine provides a general idea of growth rate for relatively fast growing tree species.

Oaks, beeches, and other shade-tolerant climax species would be expected to voluntarily establish in the shade of the stand as their nuts are dispersed naturally by squirrels and other wildlife. Mountain laurel and other understory and groundcover vegetation typical of mixed deciduous forests would also be expected to gradually become established under the shade of the closed canopy. The floristic composition of the stand will gradually approach that of the existing mixed deciduous forest on the CCNPP site, a process that could require more than 100 years.

A field survey will be needed during construction activities to determine the appropriate areas for onsite mitigation as forested and other naturally vegetated areas (meadows, shrub/scrub) and the best old field habitats to replant with the showy goldenrod. Therefore the exact locations and habitat type will be determined at a later date. As stated previously, mitigation plans will be developed in consultation with the State and local resource agencies.

Wetlands: Wetland mitigation in Maryland is driven primarily by conditions established by the USACE and MDE in permits issued under Section 404 of the Federal Water Pollution Control Act (USC, 2007) and the Maryland Nontidal Wetlands Protection Act (COMAR, 2005). Wetland mitigation follows a sequencing process beginning with avoidance of wetland impacts, then minimization of wetland impacts, and lastly compensatory mitigation to offset impacts. The proposed facilities have been sited, and the proposed construction has been configured, to avoid encroaching into wetlands (and a surrounding 50 ft (15 meter) wide buffer) to the extent possible. Other factors such as minimizing encroachment into the CBCA, keeping NRC-required buffers within the CCNPP site boundaries, and situating the power block close to the existing CCNPP units were considered; hence the wetland impacts detailed above must be considered unavoidable.

Several measures will be taken to minimize the unavoidable adverse effects to wetlands. The use of silt fences, temporary and permanent vegetative stabilization, and other soil erosion and sediment control practices would reduce the risk of sediment runoff into intact wetlands adjoining the areas of fill. Bio-retention ditches will be constructed around the periphery of the power block, construction laydown area, cooling tower and switchyard areas to help catch surface runoff and prevent degradation of adjoining terrestrial and aquatic habitats. The ditches would be constructed of base materials that promote infiltration of runoff from low intensity rainfall events. However, for large storms the infiltration capacity of the base materials would be exceeded and the overflow pipes would direct the runoff to the stormwater retention basins. The stormwater retention basins would be unlined impoundments, vegetated with regionally indigenous wetland grasses and herbs, with simple earth-fill closure on the down stream end and could include discharge piping to the adjacent watercourses.

Commonly used forms of compensatory wetland mitigation include restoration or enhancement of degraded wetlands, creating (constructing) wetlands in areas that are not wetland, and preserving areas of intact wetlands,. The proposed wetland impacts would be permanent; hence, restoring the filled wetlands after completion of construction activities would not be possible.

Several opportunities exist to enhance existing wetlands on the CCNPP site. Several of the wetlands in peripheral areas of the CCNPP site will not be filled during construction have become infested with near-monocultures of the invasive grass *Phragmites*. Eradicating *Phragmites* from those wetlands and restoring regionally indigenous wetland vegetation in its place is an applicable form of wetland mitigation. Several stream channels in some peripheral parts of the CCNPP site have become scoured by runoff. Efforts to stabilize eroding channel banks and divert runoff from streams would be another possible form of wetland mitigation. Opportunities may exist to construct new wetlands on the CCNPP site. The soils and surface hydrology of any candidate area for wetland creation would have to be evaluated in detail to quantitatively determine that wetland construction is feasible.

In summary, the following mitigation measures will be implemented for wetlands:

- The use of silt fences, temporary and permanent vegetative stabilization, and other soil erosion and sediment control practices will be implemented to reduce the risk of sediment runoff into intact wetlands adjoining the areas of fill;
- Dust suppression methods will be implemented such as using bag houses on the concrete batch plant, watering unpaved roads throughout the construction site and watering during backfill operations;
- Bio-retention ditches will be constructed around the periphery of the power block, construction laydown area, cooling tower and switchyard areas to help catch surface runoff and prevent degradation of adjoining terrestrial and aquatic habitats;
- *Phragmites* Eradication from infested onsite wetlands and restoration of regionally indigenous wetland vegetation in its place;
- Stabilization of eroding channel banks near the areas impacted by the construction of CCNPP Unit 3;
- Restoration of wetland and wetland buffer temporarily disturbed during construction; and
- If practicable, construction of new wetlands in favorable areas of the CCNPP site.

A field survey will be needed during construction activities to determine appropriate areas for onsite wetland mitigation. Therefore, the exact location and size of areas to be constructed for wetlands would be determined at a later date. As stated previously, mitigation plans will be developed in consultation with the state and local resource agencies.**}**

4.3.2 AQUATIC ECOSYSTEMS

{This section provides an assessment of the potential impact construction activities will have on aquatic ecosystems to impoundments and streams onsite and to the Chesapeake Bay offsite. New transmission lines and access corridors are limited to the CCNPP site. The existing transmission corridor will be used offsite.

As shown in Table 4.3-2, 2.69 acres (1.09 hectares), of the affected aquatic habitat, will be permanently converted to structures, pavement, or other intensively-maintained exterior grounds to accommodate the proposed power block, cooling tower, switchyard, roadways, permanent construction laydown area, borrow area, retention basins, and permanent parking lots. The permanent loss of affected aquatic habitat of 2.69 acres (1.09 hectares) is small compared to the 1,548,769 acres (626,787 hectares) in the region as shown in Table 2.2.3-1. Figure 2.2.1-1 shows the CCNPP site boundary and the major buildings to be constructed. Figure 4.3-2 shows the land to be cleared, the waste disposal area and the construction zone. A topographic map is provided as Figure 2.3.1-2, showing the important aquatic habitats. A similar analysis is discussed for wetlands in Section 4.3.1.

Section 4.2 includes a footprint of the construction area and a description of construction methods. Construction activities will start after the State of Maryland issues the appropriate permits to start clearing and grading of the CCNPP site. Activities to construct non-safety-related systems and structures will begin after that. The NRC combined license is expected by March 2011 which will allow construction of safety-related systems and structures. Construction is expected to be complete by July 2015 as discussed in Section 1.2.7.**}**

4.3.2.1 Impacts to Impoundments and Streams

{The construction footprint of CCNPP Unit 3 covers 420 acres (170 hectares) including many separate wetland and surface water areas. Construction effects to aquatic habitats in the immediate area range from temporary disturbance to complete destruction. The following surface water bodies are potentially affected by construction activities:

- Two unnamed streams (Branch 1 and Branch 2) on the eastern side of the drainage divide, Branch 1 being downstream of the Camp Conoy Fishing Pond;
- Johns Creek, Branch 3 and Branch 4, and the unnamed headwater tributaries;
- Goldstein Branch;
- Laveel Branch;
- Camp Conoy Fishing Pond and two downstream impoundments;
- Lake Davies and two unnamed impoundments within the Lake Davies dredge spoils disposal area; and
- Chesapeake Bay and Patuxent River.

As described in Section 4.2.2.2, construction of CCNPP Unit 3 will permanently destroy some of the existing surface water bodies. Construction impacts to the existing surface water bodies are summarized as follows:

- Increasing runoff from the approximately 333 acres (135 hectares) of impervious and relatively impervious surfaces for the CCNPP Unit 3 power block pad, cooling tower pad, switchyard, laydown, and parking areas;
- Infilling and eliminating the Camp Conoy Fishing Pond under the southeast portion of the laydown area south of the CCNPP Unit 3 power block foundation;
- Infilling and eliminating the upper reaches of Branch 2 and Branch 3, and an unnamed tributary to Johns Creek;
- Isolating portions of the upper reach of Branch 1 by construction of the laydown areas south of the CCNPP Unit 3 power block foundation;
- Disruption of the drainage in the Lake Davies dredge spoils disposal area with possible impacts on the two downstream impoundments;
- Wetlands removal and disruptions; and
- Possibly increasing the sediment loads into the proposed impoundments and downstream reaches.

The overall site drainage basin areas are not directly affected by the site grading plan. The 80%/20% drainage proportion to the west and east respectively, would stay the same during and after construction. Approximately 15 to 20 acres (6 to 8 hectares) would be added to the east drainage basin and removed from the west drainage basin.

Dredging will take place at the barge slip area to accommodate delivery of large components. Dredging will also be performed for construction of the discharge line from the circulating water system. Dredged material will be disposed of in the previously used disposal area known as Lake Davies.

When a surface water body is filled by construction activities, impacts to aquatic life are expected. If the water body has an outlet, and the disturbance is gradual rather than abrupt, some fish may relocate. Oftentimes, however, construction impacts to small impoundments or stream reaches result in loss of the fish and invertebrates.

As discussed in Section 2.4.2 extensive surveys of the onsite streams and impoundments documented that no rare or unique aquatic species occur in the construction zone. The aquatic species that occur onsite are ubiquitous, common, and easily located in nearby waters. Typical fish species include the eastern mosquito fish and the bluegill. The most important aquatic invertebrate species in the impoundments and streams are the juvenile stages of flying insects; these species readily recolonize available surface waters, and so would not be lost to the area. No important aquatic habitats were identified in the freshwater systems in the project vicinity. The fish in the Camp Conoy pond are most likely to perish during construction activities as the overflow from the pond flows down to the Chesapeake Bay via two small impoundments. The fish in the tributaries of John's Creek would most likely swim away from the affected areas to other parts of the creek outside the construction footprint.

Table 2.4.2-5 provides a list of important species and habitats found in the Chesapeake Bay. Figure 2.4.2-1 is a map of important species and habitats. One important species, because it is commercially harvested, is the American eel (*Anguilla rostrata*). It is found in most of the water bodies onsite and in the Chesapeake Bay. As discussed in Section 2.4.2, the American eel is abundant year round in all tributaries to the Chesapeake Bay.

Onsite streams and ponds were described in terms of the typical surface water habitats in the area. Headwater streams in general are considered important; however, there is nothing of regional significance about these particular streams. All of the onsite aquatic species mentioned in this section are common in the area. No loss of critical habitat is anticipated.

Although the wetland areas themselves are considered a sensitive and valuable resource, the particular wetlands that will be impacted onsite are not substantively distinguishable from other wetland acreage in the vicinity. Additional details of the specific plants that will be lost in each area are presented in the final Wetland Delineation Report (TTNUS, 2007e).

Several other drainages and impoundments at the CCNPP site will be moderately to severely impacted. It is possible, and even likely, that some sediment will be deposited in wetlands, including impoundments and stream channels, with rainfall runoff during and immediately following construction. Best construction management practices will reduce the amount of erosion and sedimentation associated with construction, however, and would limit impacts to aquatic communities in down-gradient water bodies. Although unlikely, it is also possible that excavated soil placed in the proposed spoils and overflow storage area will be disturbed and move with runoff into streams onsite. Details are summarized herein:

- Increased runoff from 133 acres (53 hectares) of impervious surfaces for the power block pad, the cooling tower pad, and the switchyard;
- Creation of a large impoundment east of the power block pad by construction of a dam, discharge structure and piping that will discharge to the impoundment down stream of the Camp Conoy fishing pond;
- Creation of bio-retention ditches on the periphery of the power block, laydown, cooling tower and switchyard areas. The ditches are constructed of base materials that promote infiltration of runoff from low intensity rainfall events. However, for large storms the infiltration capacity of the base materials will be exceeded and the overflow pipes are provided to direct the runoff to the stormwater basins. The stormwater basins are unlined impoundments with simple earth-fill closure on the down stream end and may include discharge piping to the adjacent watercourses.
- Creation of new impoundments southwest of the proposed switchyard and cooling tower pads for stormwater detention with associated discharge structures and outlet piping to the unnamed tributary of Johns Creek;
- Disruption of the drainage in the Lake Davies dredge spoils disposal area with possible impacts on the two downstream impoundments;

* Wetlands removal and associated impacts; and
* Increased sediment loads into the proposed impoundments and downstream reaches of Johns Creek and its associated tributaries, Branch 1 and Branch 2.

Proposed construction activities that will potentially affect onsite water bodies are described in Section 4.2. During construction, effects to aquatic ecosystems may result from sedimentation (due to erosion of surface soil) and, to a lesser extent, spills of petroleum products. A report on human impacts to stream water quality listed siltation as the primary cause of stream degradation by a wide margin (Waters, 1995). In a 1982 nationwide survey by the U.S. Fish and Wildlife Service on impacts to stream fisheries, sedimentation was named the most important factor (Waters, 1995).

Three major groups of aquatic organisms are typically affected by the deposition of sediment in streams: (1) aquatic plants, (2) benthic macro invertebrates, and (3) fish. The effects of excess sediment in streams, including sediment generated by construction activities, are influenced by particle size. Finer particles may remain suspended, blocking the light needed for primary producers photosynthesis, and initiating a cascade of subsequent effects (Waters, 1995) (MDE, 2007a). Turbidity associated with suspended sediments may reduce photosynthetic activity in both periphyton and rooted aquatic plants. Suspended particles may also interfere with respiration in invertebrates and newly hatched fish, or reduce their feeding efficiency by lowering visibility. Slightly larger particles fall out of suspension to the stream bed, where they can smother eggs and developing fry, fill interstitial gaps, or degrade the quality of spawning grounds. As the gaps in the substrate are filled, habitat quality is decreased for desirable invertebrates such as Ephemeroptera, Plecoptera, and Trichoptera, and less desirable oligochaetes and chironomids become dominant (Waters, 1995). Such changes in the benthic community assemblage result in a loss of fish forage, and a subsequent reduction in fish populations.

Construction sites contribute to erosion, which can lead to sedimentation in streams. Construction-related activities such as excavation, grading for drainage during and after construction, temporary storage of soil piles, and use of heavy machinery all disturb vegetation and expose soil to erosive forces. Reducing the length of time that disturbed soil is exposed to the weather is an effective way of controlling excess erosion and sedimentation.

Preventing onsite erosion by covering disturbed areas with straw or matting is also a preferred method of controlling sedimentation. When erosion cannot be prevented entirely, intercepting and retaining sediment before it reaches a stream is a high priority.

Several measures will be taken to minimize the unavoidable adverse effects to the aquatic ecology. The use of silt fences, temporary and permanent vegetative stabilization, and other soil erosion and sediment control practices will reduce the risk of sediment runoff into intact wetlands adjoining the areas of fill. Bio-retention ditches will be constructed around the periphery of the power block, construction laydown area, cooling tower and switchyard areas to help catch surface runoff and prevent degradation of adjoining terrestrial and aquatic habitats. The ditches will be constructed of base materials that promote infiltration of runoff from low intensity rainfall events. However, for large storms the infiltration capacity of the base materials will be exceeded and the overflow pipes will direct the runoff to the stormwater retention basins. The stormwater retention basins will be unlined impoundments, vegetated with regionally indigenous wetland grasses and herbs, with simple earth-fill closure on the down stream end and will include discharge piping to the adjacent watercourses.

Construction impacts to water resources will be avoided or minimized through best management practices and good construction engineering practices such as stormwater retention basins and silt screens (MDE, 2007b). The Stormwater Pollution Prevention Plan, which provides explicit specifications to control soil erosion and sediment intrusion into wetlands, streams and waterways will be followed. The Spill Prevention, Control and Countermeasure Program will also be used to clean up and contain oil spills from construction equipment to avoid or minimize the impact to wetlands and waterways.**}**

4.3.2.2 Impacts to Chesapeake Bay

{As discussed in Section 2.4.2, the Chesapeake Bay is considered important estuarine habitat to most, if not all, of the estuarine species identified in the area. However, none of the important species in the vicinity of the CCNPP site are endemic to Chesapeake Bay. All of them range widely throughout the mid-Atlantic coast, and most occur in the Gulf of Mexico, as well.

The portion of the Chesapeake Bay nearest the CCNPP site is of lower relative importance compared to other areas of the Chesapeake Bay. Estuarine species that use the Chesapeake Bay as nursery grounds need the submerged aquatic vegetation (SAV) and tidal marshes for nutrient-rich forage for the larvae and young-of-the-year, as well as for protective cover from predators. The area near the CCNPP site has no SAV, and does not provide critical habitat for any species.

The National Marine Fisheries Service designated Essential Fish Habitat (EFH) for each life stage of federally managed marine fish species in the Chesapeake Bay area; the bluefish is the only important species in the CCNPP site area that is federally managed, and for which EFH has been designated. Bluefish eggs and larvae are found only offshore, so no EFH occurs in Chesapeake Bay. For juvenile bluefish, all major estuaries between Penobscot Bay (Maine) and St. Johns River (Florida) are EFH. Generally juvenile bluefish occur in North Atlantic estuaries from June through October, Mid-Atlantic estuaries from May through October, and South Atlantic estuaries March through December, within the "mixing" and "seawater" zones. Adult bluefish are found in North Atlantic estuaries from June through October, Mid-Atlantic estuaries from April through October, and in South Atlantic estuaries from May through January in the "mixing" and "seawater" zones. Bluefish adults are highly migratory and distribution varies seasonally and according to the size of the individuals comprising the schools. Bluefish are generally found in waters with normal shelf salinities (greater than 25 parts-per-thousand).

The threatened and endangered species known to occur in the area are two species of sturgeon and two of sea turtles. No sturgeon is known to have spawned in the Chesapeake in decades. The sea turtles that occasionally use the Chesapeake Bay spawn much further south, outside the Chesapeake Bay watershed.

No effects of sedimentation or runoff into the Chesapeake Bay are expected. However, construction of the intake structure and discharge pipeline, and enlargement of the barge slip, will cause some disturbance in the Chesapeake Bay. As described in Section 4.2.1, a sheet pile cofferdam and dewatering system will be installed on the south side of the CCNPP Units 1 and 2 intake structure to facilitate the construction of the CCNPP Unit 3 circulating and service water intake structure and pump house. Pilings may also be driven into the seabed to facilitate construction of new discharge system piping. Enlargement of the barge slip is estimated to require removal of about 15,000 cubic yards (11,500 cubic meters) of sediment. Dredging of the barge slip would result in increased suspended sediment in the immediate area for approximately two weeks. Excavation and dredging of the intake structure would have similar effects. All dredging will conform to guidance provided by the Maryland Port Authority and dredging permit conditions including mitigation measures to minimize suspended sediment and other impacts.

Dredging inevitably causes an increase in suspended sediment in the immediate area, and may result in a plume of suspended sediment some distance from the site. In a study of the effects of hopper dredging in Chesapeake Bay, near-field concentrations of suspended sediment, < 980 ft (< 300 m) from the dredge, reached 840 to 7,200 mg/L or 50 to 400 times the normal background level. Far-field concentrations (> 980 ft (> 300 m)) were enriched 5 to 8 times background concentrations and persisted 34% to 50% of the time during a dredging cycle (1.5 to 2.0 hr) (Nichols, 1990).

The ecological effect of the suspended sediment depends on a variety of factors, including the type of dredge used, the timing and duration of the dredging, the particle size of the suspended sediment, the presence of toxins in the sediment, the success of environmental controls to contain suspended sediment, and the life stage of the species present. Both short term direct behavioral effects (such as entrainment, turbidity, fish injury, and noise) and long term cumulative effects (such as possible contaminant release and habitat alteration) on marine organisms can result from dredging (Nightingale, 2001). Although effects may be similar, concern is often greater at the disposal site than at the dredge site; controversy over the effects of disposal of dredge spoils in the Chesapeake Bay has been ongoing since the 1970s (MSG, 2000). A thorough independent scientific investigation of the effects of disposing of large volumes of sediment in a deep channel of the Chesapeake Bay concluded that, apart from possibly affecting migrating sturgeon, no significant biological effects resulted from the deposition of sediment in the channel. Although this study is not directly applicable to the small-scale dredging proposed for CCNPP Unit 3, it serves as reassurance that the Chesapeake Bay is so large, and has such an enormous volume of water flowing through it, that even extremely large disturbances, such as the deposition of dredged material from Baltimore Harbor, have a negligible long term effect on the Chesapeake Bay ecosystem (MSG, 2000).

Small-scale dredging like that required to construct CCNPP Unit 3 is not considered a significant impact to the Chesapeake Bay. A report by the NOAA Chesapeake Bay Office, developed by a Technical Advisory Panel comprised of top fisheries scientists from area universities and senior government fisheries scientists, presented a Fisheries Ecosystem Plan for the Chesapeake Bay; it is notable that the only mention of the effects of dredging in the 450 page report were the following two general statements: “Dredging and the displacement of dredge spoil to other parts of the Chesapeake Bay can affect fish and shellfish by removing or inundating slow-moving or sessile species and their prey. Dredge spoil can also reintroduce sedimentary inventories of nutrients and contaminants into the water” (Chesapeake Bay Fisheries Ecosystem Advisory Panel (NOAA, 2006)). The report also acknowledged that the effects of even widely-used methods of harvest that disturb bottom sediments, such as trawling and crab dredging, remain unknown.

Excavation and dredging of the intake structure, discharge pipe, and barge slip will continue through CCNPP site preparation into plant construction. Excavated and dredged material will be transported to the onsite Lake Davies dredge spoils area as shown in Figure 4.3-1. Figure 3.4-8 show the show location of the intake and outfall structures areas and the barge slip.

Important species in the project area that may be temporarily affected by dredging include eggs, larvae, and adults of invertebrates and fishes. Based on the monitoring of the baffle wall and intake screens for CCNPP Units 1 and 2, Bay anchovy and Atlantic menhaden are the most common mid-water fish species in the immediate area (EA, 2006). These species may be temporarily affected by high levels of suspended sediment, which can interfere with foraging and respiration, as well as cause dermal abrasion to delicate fishes. No invertebrate sampling data are available in the intake area. In a study of dredging in Chesapeake Bay, benthic communities survived the deposition of suspended sediment despite the exceedance of certain water quality standards (Nichols, 1990).

No threatened or endangered species are expected to be affected by the proposed dredging. During the license renewal review process in 1999 for CCNPP Units 1 and 2, the National Marine Fisheries Service concluded that CCNPP license renewal would not adversely affect either the shortnose sturgeon or the loggerhead turtles because the CCNPP Units 1 and 2 discharge/intake do not lie within the areas normally used by either species (NRC, 1999). Neither the shortnose sturgeon nor the loggerhead turtle has been found impinged on the CCNPP Unit 1 and 2 intake screens during the 21 years of monitoring data (NRC, 1999).

The assemblage of aquatic species present near the CCNPP site varies throughout the year, due to spawning and migration patterns of individual fish and invertebrate species, as described in Section 2.4.2. The season of the year in which dredging and construction occur would determine to a large extent the impact on specific aquatic resources within the Chesapeake Bay. However, because the area to be dredged is small and in a protected near shore area that is already dedicated to intake functions, the overall impact on eggs and larvae is expected to be SMALL and TEMPORARY.**}**

4.3.2.3 Impacts on the Transmission Corridor and Offsite Areas

{The new transmission lines do not cross over any onsite water bodies. At one point, the transmission corridor right-of-way is near Johns Creek. No important aquatic species and their habitat will be impacted by the transmission corridor.

Transmission line construction will be limited to onsite construction of short connections from the new switchyard to the existing 500 kV transmission line that runs from near the center of the CCNPP site northward. Construction of a 500 kV transmission line from the CCNPP Unit 3 switchyard to the existing 500 kV transmission line on the CCNPP site will require clearing trees in 0.31 acres (0.13 hectares) of additional forested wetlands in Wetland Assessment Area IV (adjoining 520 linear feet (158 m) of intermittent stream channel), as well as in 1.85 acres (0.75 hectares) of additional forested uplands designated as non-tidal wetland buffer by Calvert County. No grading will be conducted in the subject wetlands or wetland buffer; disturbance will be limited to tree and shrub removal only. Surface soils within the affected wetlands and buffer will remain undisturbed, as will the pattern of surface runoff. The vegetation impacts to the affected wetlands and buffer are necessary because trees growing close to a 500 kV electric conductor must be removed to prevent possible outages. The transmission line is needed to convey electric power generated by the CCNPP Unit 3 power block to existing transmission lines that connect to the regional power grid.

The onsite transmission corridor for CCNPP Unit 3 is within the construction area. The information provided above pertaining to control of erosion and sedimentation applies to streams and wetlands within the transmission corridor.

No incremental effect on aquatic resources beyond what currently occurs within the transmission corridor is expected for the construction of CCNPP Unit 3.

The existing offsite transmission corridor will be used for CCNPP Unit 3. No new transmission corridors and no offsite areas are impacted since no changes are required.**}**

4.3.2.4 Summary

{Construction activities that may cause erosion that could lead to harmful deposition in aquatic water bodies would be (1) of relatively short duration, (2) permitted and overseen by state and federal regulators, and (3) guided by an approved Stormwater Pollution Prevention Plan. Any small spills of construction-related hazardous fluids, such as petroleum products, would be mitigated according to a Spill Prevention, Control, and Countermeasure Plan. Some sensitive habitats occur within the area expected to be affected by construction activities; however, no important aquatic species are expected to be affected. Impacts to aquatic communities from construction would be SMALL and temporary, and would not warrant mitigation.

No incremental effect on aquatic resources beyond what currently occurs within the transmission corridor is expected.**}**

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Table 4.3.1-1 Vegetation (Plant Community) Impacts in Acres (Hectares) Construction of Proposed CCNPP Unit 3 (Page 1 of 1)

Habitat (Plant Community Type)	Forest (MDNR Definition)	Wetland (Federal and MDE Definition)	Permanent Losses					Temporary Losses					Total
			CBCA IDA 0-100’ (0-30 meters)	CBCA IDA 100-1,000’ (30 - 305 meters)	CBCA RCA 0-100’ (0-30 meters)	CBCA RCA 100-1,000’ (30 -305 meters)	Rest of Site	CBCA IDA 0-100’ (0-30 meters)	CBCA IDA 100-1,000’ (30 - 305 meters)	CBCA RCA 0-100’ (0-30 meters)	CBCA RCA 100-1,000’ (30 -305 meters)	Rest of Site	
Lawns/Developed Areas	No	No	0.25 (0.10)	1.76 (0.71)	-	5.21 (2.11)	19.33 (7.82)	-	-	-	-	24.30 (9.80)	50.85 (20.58)
Old Field Vegetation	No	No	0.09 (0.04)	1.13 (0.46)	-	0.23 (0.09)	27.35 (11.07)	-	-	-	-	96.00 (38.80)	124.80 (50.50)
Mixed Deciduous Forest	Yes	No	0.01 (0.004)	13.96 (5.65)	-	5.20 (2.10)	133.81 (54.15)	-	-	-	-	26.44 (10.70)	179.42 (72.61)
Mixed Deciduous Regeneration Forest	Yes	No	-	-	-	-	36.28 (14.68)	-	-	-	-	12.00 (4.90)	48.28 (19.54)
Well-Drained Bottomland Deciduous Forest	Yes	No	-	-	-	-	1.37 (0.55)	-	-	-	-	0.05 (0.02)	1.42 (0.57)
Poorly Drained Bottomland Deciduous Forest	Yes	Yes	-	0.15 (0.06)	-	0.49 (0.20)	7.84 (3.17)	-	-	-	-	2.53 (1.02)	11.01 (4.46)
Herbaceous Marsh Vegetation	No	Yes	-	0.05 (0.02)	-	0.02 (0.01)	1.56 (0.63)	-	-	-	-	1.63 (0.66)	3.26 (1.32)
Successional Hardwood Forest	Yes	No	-	-	-	1.71 (0.69)	3.50 (1.40)	-	-	-	-	7.82 (3.16)	13.03 (5.27)
Open Water	No	Yes	-	0.02 (0.01)	-	-	2.54 (1.03)	-	-	-	-	-	2.56 (1.04)
Total			0.35 (0.14)	17.07 (6.91)	-	12.86 (5.20)	233.58 (94.53)	-	-	-	-	170.77 (69.11)	434.63 (175.89)
			Total Permanent: 263.86 (106.78)					Total Temporary: 170.77 (69.11)					

Notes:

MDNR: Maryland Department of Natural Resources
MDE: Maryland Department of the Environment
CBCA: Chesapeake Bay Critical Area
IDA: Intensive Developed Area (within CBCA)
RCA: Resource Conservation Area (within CBCA)

Table 4.3.1-2 Non-Tidal Wetland and Non-Tidal Wetland Buffer Losses in Acres (Hectares) Construction of Proposed CCNPP Unit 3 (Page 1 of 1)

Wetland Assessment Area	Permanent Grading Losses				Temporary Grading Losses				Permanent Non-Grading Losses (Forest Clearing for Transmission Line)				Total Losses	
	PFO	PEM	Open Water	Buffer	PFO	PEM	Open Water	Buffer	PFO	PEM	Open Water	Buffer	Wetland	Buffer
I- Total	**0.85 (0.34)**	**0.05 (0.02)**	**0.02 (0.01)**	**6.45 (2.61)**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**0.92 (0.37)**	**6.45 (2.61)**
I-Outside CBCA	0.52 (0.21)	-	-	3.79 (1.53)	-	-	-	-	-	-	-	-	0.52 (0.21)	3.79 (1.53)
I-Inside CBCA-IDA	0.15 (0.06)	0.05 (0.02)	0.02 (0.01)	1.42 (0.57)	-	-	-	-	-	-	-	-	0.22 (0.09)	1.42 (0.57)
I-Inside CBCA-RCA	0.18 (0.07)	-	-	1.24 (0.50)	-	-	-	-	-	-	-	-	0.18 (0.07)	1.24 (0.50)
II- Total	**1.50 (0.6)**	**0.78 (0.32)**	**2.67 (1.08)**	**7.18 (2.91)**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**4.95** (2.00)	**7.18** (2.91)
II-Outside CBCA	1.18 (0.48)	0.76 (0.31)	2.66 (1.08)	6.33 (2.56)	-	-	-	-	-	-	-	-	4.60 (1.90)	6.33 (2.56)
II-Inside CBCA-RCA	0.32 (0.13)	0.02 (0.01)	0.01 (0.004)	0.85 (0.34)	-	-	-	-	-	-	-	-	0.35 (0.14)	0.85 (0.34)
III-Total	No Impacts to Wetland Assessment Area III													
IV-Total	**5.29 (2.14)**	**-**	**-**	**15.34 (6.21)**	**-**	**-**	**-**	**-**	**0.31 (0.13)**	**-**	**-**	**1.85 (0.75)**	**5.60 (2.30)**	**17.19 (6.96)**
V-Total	No Impacts to Wetland Assessment Area V													
VI-Total	**0.36 (0.15)**	**0.50 (0.20)**	**-**	**1.12 (0.45)**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**0.86 (0.35)**	**1.12 (0.45)**
VII-Total	**0.88 (0.36)**	**-**	**-**	**3.44 (1.39)**	**2.63 (1.06)**	**1.65 (0.67)**	**-**	**9.32 (3.77)**	**-**	**-**	**-**	**-**	**5.16 (2.09)**	**12.76 (5.16)**
VIII-Total	No Impacts to Wetland Assessment Area VIII													
IX-Total	**0.64 (0.26)**	**0.48 (0.19)**	**-**	**3.34 (1.35)**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1.12 (0.45)**	**3.34 (1.35)**
Total	9.52 (3.85)	1.81 (0.73)	2.69 (1.09)	36.87 (14.92)	2.63 (1.06)	1.65 (0.67)	-	9.32 (3.77)	0.31 (0.13)	-	-	1.85 (0.75)	18.61 (7.53)	48.04 (19.44)

Notes:
PFO: Palustrine Forested CBCA: Chesapeake Bay Critical Area RCA: Resource Conservation Area
PEM: Palustrine Emergent IDA: Intensively Developed Area

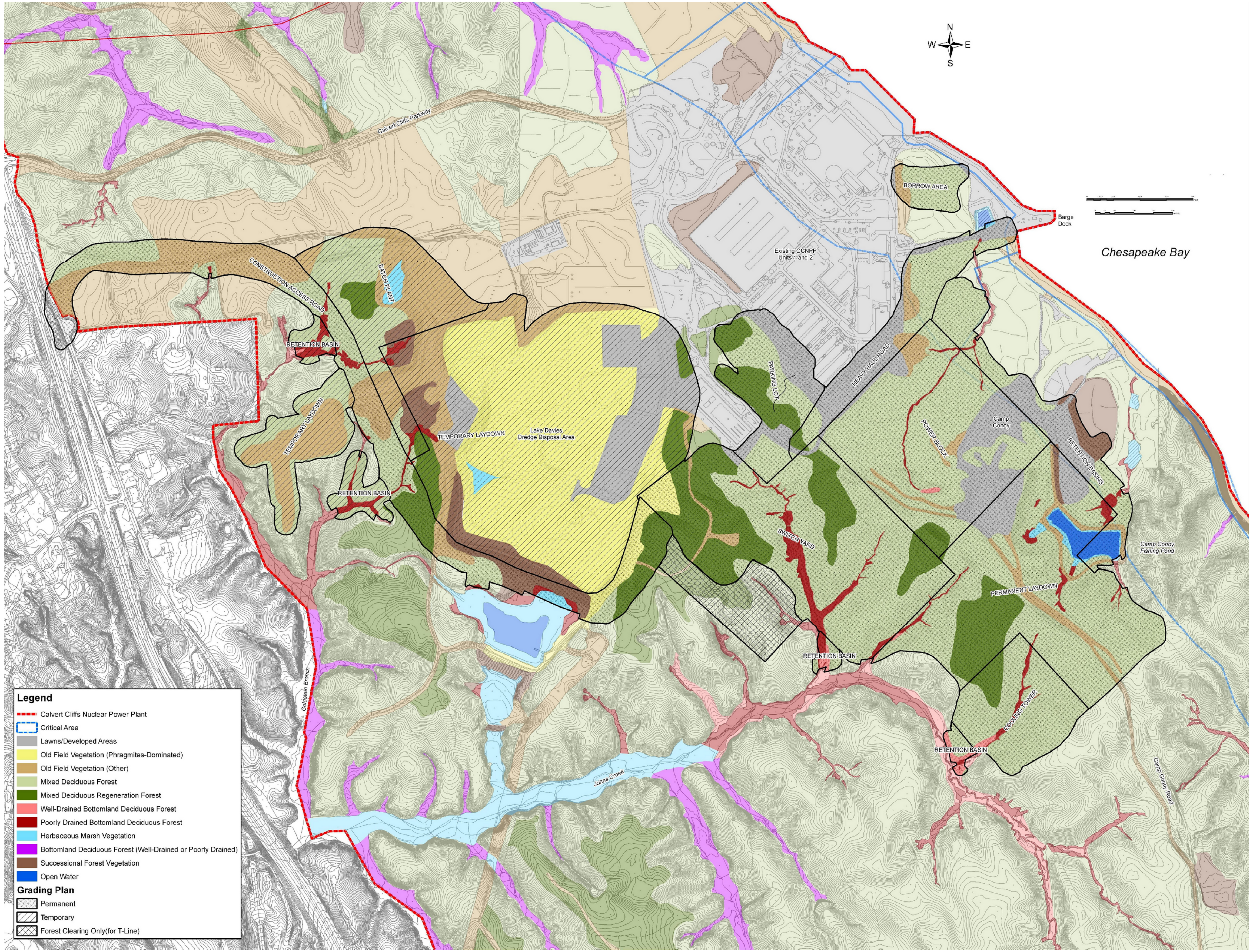

FIGURE 4.3-1 **Rev. 2**

{CCNPP} VEGETATION IMPACTS

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CCNPP UNIT 3 ER